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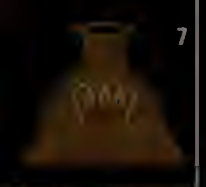
Power Issue

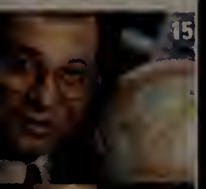
THE Signature SERIES

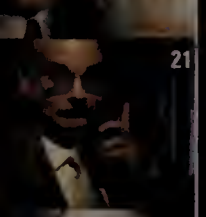
A tribute to network power

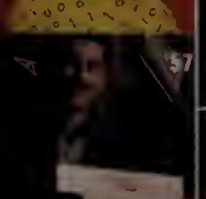
Here we are, at the end of one of the most desperate years the network industry has ever endured. Mainstay telecom equipment providers have withered, one-time high-flying application service provider, DSL and Web hosting markets have collapsed, and countless e-commerce ventures have flamed out. Yet, despite the misfortunes at so many companies, you don't have to look too far for evidence of power. Within the pages of this, our eighth annual Power Issue, you'll find it in the profiles of companies exercising their influence, people grabbing opportunity and technologies making their mark in the enterprise. This issue stands as a testament that networking as a whole, despite the foundering economy, will continue to thrive.

Beth Schultz, Editor, Signature Series
bschultz@nww.com









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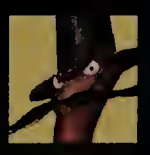

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The Signature Series

The Power Issue is one of six bimonthly supplements providing insights, opinions and information on the biggest trends shaping the networked world. Look for our guide to conducting e-commerce in the next Signature Series installment, the Electronic Commerce Issue, coming Feb. 18.

POWER ONLINE

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THE POWER PACK

Our guide to the most powerful vendors in the network industry.

- **10 MOST POWERFUL COMPANIES** See story this page.
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The 10 most powerful companies in networking

Selected by *Network World* editors and advisers, the following companies lead their respective niches, as well as the network industry as a whole. They demonstrate technology influence and prowess beyond compare.

BY JULIE BORT

AT&T: Patents and data services

ILLUSTRATIONS BY H.C. WOODRUFF

Although AT&T endured a bumpy 2001 (like most telecom providers), it smoothed over enough rough spots to ensure its continued presence among the power elite.

AT&T made headway in its plans to tread more heavily into business services and away from the go-nowhere long-distance market. AT&T Business gained traction in IP services, increasing revenue year over year in the third quarter by about 25%, according to financial reports. This included gains in IP connectivity, VPNs and especially hosting services.

While AT&T remained the No. 1 long-distance provider, the terminally ill prospects of that line of business has led gossipmongers to premature proclamations that AT&T is a goner. True, prices already have eroded, and the regional Bell operating companies will soon gobble up most of the market. That makes AT&T Consumer, which provides consumer long-distance and the fiscally difficult, consumer

DSL, ripe for a sale by year-end 2002, as AT&T finishes its restructuring.

AT&T's restructuring doesn't automatically diminish the company in the network industry. In fact, a well-executed restructuring should let AT&T focus more heavily on serving the enterprise, its best bet for growth. And with its state-of-the-art backbone and hosting facilities, AT&T should remain a premier data network service provider.

Likewise, AT&T Labs, long a center of network technology creation, continues to make strides for AT&T's future with the patents it earns, such as one this year on fraud management, call-handling methods. The lab is currently working on advanced IP management, network visualization and 4G wireless streaming, as well as voice command and other consumer-oriented gambits.

FUN FACT: *AT&T has been working on speech-recognition technology since 1929, when its labs invented an artificial larynx.*

Cisco: Stronghold on IT loyalty

Even mighty Cisco suffered a brutal year of painful financials, a major restructuring and big layoffs — it shed 8,000 employees, or about 11% of its workforce.

But the company still inspires fanatic loyalty among network executives. Readers named Cisco products sweeping winners in every category in which they competed in our 2001 Best Products survey (www.nwfusion.com, DocFinder: 7333). And readers who participated in our annual Powerometer poll consider it more powerful than any other vendor in the industry but Microsoft (see story, page 12).

Still, Cisco faces big challenges. It must convert itself from a New Economy technology buyer to an Old World-style research-and-development incubator. No longer can it acquire handfuls of start-ups to see which ones pan out. (This year Cisco introduced an IP storage router that came from its $450 million buyout of NuSpeed Internet Systems in July 2000, while lack of demand led it to kill an optical Internet router picked up in its $500 million acquisition of Monterey Networks in August 1999.) In 2001, Cisco bought only two companies: Allegro Systems, for VPN acceleration technology, and AuroraNetics, for 10 Gigabit chip designs. In 2000, it bought 11 companies.

Nevertheless, $18 billion in cash is a thick cushion for restructuring into 11 technology business units. That cash also earns Cisco enough interest to pad revenue, getting Wall Street off its back while it builds R&D experience.

To that end, Cisco is racing after a boatload of emerging markets: telephony; Gigabit Ethernet in the enterprise; IP storage; 10G Ethernet in the metropolitan-area network/WAN; and wireless LANs. Beyond these, it has been tinkering with content networking, and more recently, disaster recovery.

Cisco also boosts its product power with frenetic standards-related activity. Nary a consortium exists without Cisco's membership, be it the Optical Internetworking Forum or the Storage Networking Industry Association. And Cisco retains its influence at the Internet Engineering Task Force: Cisco Fellow Fred Baker this year handed over his longtime position as captain of the IETF to another Cisco engineer, Harald Alvestrand.

FUN FACT: *Cisco, founded in 1984 by two Stanford University professors, now has a chairman, John Morgridge, who teaches part time at Stanford's School of Business.*

Dell: Master of commodities

Dell continues to reach beyond its traditional PC market. This year, it upped the ante of its network business by adding low-cost switching to its successful repertoire of servers and storage products.

When Dell moves, the industry takes notice. Its game plan is simple and effective. Rather than developing new technology, as IBM does and Cisco wants to do, Dell sells lower-cost commodity products and then inches its customers up to higher-margin items such as storage and services. Case in point: In June, Dell partnered with Inktomi to create a Web caching device using Inktomi software and a pair of Dell servers. Voilà! An instant higher-margin device for PC customers, with hardly a penny spent on R&D.

Storage remains among Dell's strongholds. This year it moved its storage lines beyond Windows and into Solaris shops, and it revamped its popular PowerVault network-attached storage (NAS) line. It then signed a multibillion-dollar deal to private label EMC's lower-end NAS product, Clariion.

In May, it cut desktop prices 10%, launching an old-fashioned PC price war against Compaq and Hewlett-Packard. This move typifies Dell's strategy as the No. 1 seller of PCs. At the same time, the company scrutinized the bottom line. After Wall Street analysts skewered Dell for missing earnings-per-share expectations by 1 cent in January, the company was determined to meet its plan. To do so it had two rounds of layoffs, cutting 1,700 employees in January and another 4,000 in May, and revised its expectations downward.

FUN FACT: *In the first quarter of 2001, Dell shipped the most servers worldwide, unseating long-standing No. 1 market share leader Compaq, according to IDC.*

EMC: Storage star

Although suffering from the sluggish economy, EMC used 2001 to attack the midrange, step into open systems and engage high-profile — perhaps brilliant — partnerships.

EMC started the year by releasing a new Clariion line that took on lower-end NAS vendors. In February, EMC released multivendor storage management software, ESN Manager, for the first time acknowledging others' hardware and taking a major step toward open systems. In May, EMC partnered with then undisputed leader in the optical market, Nortel, to create optically networked storage systems.

In September, EMC hit Compaq and Dell where they live by launching a midrange Symmetrix box. Not long after that, it shocked the storage world by partnering with those rivals. Dell will once again resell EMC products and market Clariion under its own label. This revives the reseller agreement of two years ago, before Dell slapped EMC in the face and went solo in storage. Compaq and EMC will cross-license each other's APIs in a move that sends EMC even farther down the open systems road.

To offset effects of the sluggish economy and seriously reduce net income, EMC went on a cost-control diet in which it shed 2,400 employees, or 4% of its workforce, and reorganized into three business units. The stock price of this one-time Wall Street darling dove from the $70s in January to the mid-teens at year-end. Still, EMC controls a market that will boom once IT departments start spending again.

FUN FACT: *EMC sponsors the EMC World Cup, the only team competition in the four-tournament PGA World Golf Championships.*

IBM: Shining products and financials

IBM, the perennial powerhouse, often shined brightly in this otherwise dusky year. Throughout 2001, the vendor extended the breadth of its technology, pressured its competitors and made money.

Its massive R&D labs produced several creative products this year, such as the "pixie dust" hard drives launched in November. Based on atomic-sized storage media that IBM scientists had been working on since 1990, pixie dust is said to quadruple disk drive density. Then there's the eLiza Project, IBM's efforts to imbue its servers and software with self-healing, self-managing properties. IBM used this self-healing technology to attack Sun in October with the wirelessly managed, self-healing eServer p610, starting around $7,500. IBM claims the server is faster, more energy-efficient and less expensive than the comparable Sun Fire 280R, introduced in September at $10,000 and up. The p610 employs new high-performance dual-chip technology and may be able to lower costs of per-processor software licensing fees by performing well with fewer chips. IBM initiated price wars with Sun on other products this year, too. It priced its four-way eServer p660 starting at $93,000 when the comparable Sun Fire 3800 costs about $175,000 and up.

IBM also focused on Linux, making it an option on almost all midrange or low-end boxes, introducing Linux clustering software and donating a $40 million development platform tool to a Linux advocacy group.

Voice over IP was also a thrust. In October, IBM partnered with Nortel to sell hardware and software for converged networks, and with Cisco to create and sell turnkey IP PBX systems.

True to its nickname, Big Blue stood out for its financials. Although sales were down from last year for most of its units, IBM met or beat expectations throughout the year. Even its layoffs hardly qualify as a workforce reduction. This year, IBM ditched 1,000 Global Services workers, 183 Lotus employees and about 250 Tivoli employees from a total workforce of 316,000 in 2000.

FUN FACT: *IBM employs five Nobel Prize winners at its research labs.*

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See 10 Companies, page 10

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10 Companies, continued from page 8

Microsoft: Nonstick vendor

Not even an antitrust case can keep Microsoft from industry power. By the end of 2001, Microsoft clearly came out the winner of the government's historic antitrust case — despite officially losing. The restrictions imposed amounted to a slap on the wrist, although long-term implications are uncertain. The immediate downside is that because the states have not wrapped up their complaints, this suit will remain a drag on Microsoft's attention and coffers into 2002.

Legal goings-on haven't diminished Microsoft in users' eyes. Readers who participated in our annual Powerometer poll named it the industry's most powerful company in 2001 (see story, page 12).

Microsoft remains as arrogant as ever, too. In May, it angered corporate customers worldwide with new, confusing and costly licensing schemes. Microsoft extended the deadlines for adoption when users balked, but it plans to march ahead anyway.

And it carried on its tradition of dressing up standards in proprietary code. Microsoft's Web services tools use the company's C# language and .Net framework, while all other Web services products rely on Sun's open Java language and Java 2 Platform Enterprise Edition (J2EE) framework.

The antitrust case didn't even deter Microsoft from bundling new features into its products. Even as it was awaiting word on punishment in October, it announced plans to bundle collaboration features into Windows .Net Server, perhaps damaging the emerging collaboration market in the process.

Microsoft stands alone as the industry's hardiest employer this year. It completed the year without a layoff.

FUN FACT: *A* Popular Mechanics *story inspired Paul Allen and Bill Gates in 1975 to create the BASIC computer language that would spawn the mighty Microsoft.*

Network Associates: Antivirus voltage

Computer safety has long been in the thoughts of network executives, and viruses among the most worrisome aspect. Network Associates dominates the all-important area of corporate antivirus software, controlling 34% of the market, according to IDC.

This year, Network Associates extended its antivirus breadth by imbuing McAfee products with protection from Zombie code; shipping the e500, a speedy antivirus gateway appliance; and launching ePolicy Orchestrator 2.5, a management console that processes virus-detection alerts from McAfee and Norton AntiVirus from archrival Symantec. The company also controls 75% of the emerging managed antivirus services market, IDC says.

Add to that the outright dominance of its Sniffer product line, and Network Associates emerges as a powerhouse in critical areas of network management.

Network Associates' R&D labs — McAfee's Anti-Virus Emergency Response Team and the NAI Labs — have placed it among the most respected authorities on security, too. Its labs helped it add two key patents in 2001 for technologies that ease corporate software management and update software over the Internet.

In August, Network Associates elbowed into the emerging anti-distributed denial-of-service (DoS) market by announcing it would collaborate with three start-ups to help create end-to-end protection. This after it was the target of a distributed DoS attack in February.

Another coup was the creation of a more secure version of Linux with the National Security Agency.

Still, Network Associates has shouldered ongoing, albeit improving, financial woes that led it to kill its struggling PGP firewall and encryption unit in October and to reshuffle its management team in December.

FUN FACT: *CEO George Samenuk played football for Brown University.*

Oracle: Database, app power

In 2001 Oracle wobbled on the power tightrope, but safely crossed to the other side. While market researchers quibble on the exact numbers, most concur that Oracle's lead over No. 2 IBM in the Unix database market lessened this year. The reasons are many: IBM's purchase of Informix, the difficulty in doing business with a company as arrogant as Oracle, high prices, a fallout in Oracle's 2000 core growth markets (dot-com and ASP) and — critically important — Oracle's hands-off policy on its applications.

But competition can be a source of strength, and so it was for Oracle. The software maker showed the sense to shift its weight on several core issues. In June, Oracle met IBM's price-war challenge and dropped its controversial capacity-based pricing scheme for a more conventional processor-based one. Oracle claims such licensing makes 9i more affordable than DB2, and drops prices for its customers by as much as 18%.

In August, Oracle promised to publish the APIs to its 11i E-Business suite. Customers have long pressured Oracle to open its applications, and in this case they got help from a class-action lawsuit filed in March on behalf of investors. The suit claims Oracle released 11i knowing it had major flaws.

Users hail any move that opens the Oracle APIs, which have been glued shut. But the company has certainly not yet rescinded its position that customers use it as a single source.

FUN FACT: *Oracle's initial funding was $2,000, all from founders' pockets.*

Sun: Beefy servers plus Java

When most companies reach the size and power of Sun, they become the Establishment. Yet, Sun, the top seller of Unix servers and operating systems, continues to act the rebel, constantly pursuing so-called disruptive technologies. Think of all that Java has become.

In 2001, Java grew beyond a straightforward attack on Microsoft's operating system dominance into a de facto standard for Web services. Vendors such as BEA Systems, IBM and Oracle have licensed J2EE for building their Web services development tools. That leaves Microsoft's .Net supported only in Redmond, Wash.

Yet sometimes Sun is so focused on trumping a rival that it loses track of the areas in which it already dominates. Sun continually rolls out faster scalable processor architecture (SPARC) chips for servers but has let its creativity lag. Analysts contend that it has fallen behind competitors such as IBM on CPU performance. IBM's price-war tactics this year also hit Sun in its sweet spot — higher-margin servers. This occurred on top of the pains of watching one of its major customer markets, telecom, implode. Sun joined the ranks of the layoff lords in August when it announced it would cut 300 jobs — although a pittance of its nearly 44,000-employee workforce.

This year it again set its sights on usurping the mid-range Wintel market by introducing the V880 SPARC server. Priced to compete with Dell's 64-bit servers, in most configurations it is still more expensive. This is not the best way to tackle a market known for its cost-consciousness. Still, Sun never plays the ostrich. It has always consciously decided it would rather own the high end than the low, and has so far executed according to plan.

FUN FACT: *Disney used more than 100 Sun Enterprise 4000 servers to create "Toy Story," the first fully computer-generated feature film.*

Verizon: Telecom steamroller

Clearly, the New York financial markets can't operate without communications, and that means Verizon. That alone would be enough to name a network company among the nation's most powerful. But keeping the markets online is only a tiny portion of its influence. Its newfound stature in long-distance, coupled with massive wireless and consumer telephone share, ensure its power.

Verizon, the nation's largest RBOC, gained approval in 2001 to operate long-distance services in yet another state in its region, Pennsylvania, bringing the total to four with Connecticut, Massachusetts and New York. It offers long-distance in nearly all of its coverage area — 40 states so far — able to compete in those areas where it is not considered the incumbent local carrier through the former GTE territories. It expects to nab approval for New Jersey and Washington, D.C., in less than two years.

Verizon dominates in wireless, too. It claims 27 million wireless voice and data customers, and availability in 96 of the top 100 U.S. markets. That base will likely grow following the Federal Communications Commission's November decision to relax and ultimately drop the cap for the amount of spread spectrum one carrier can dominate. Verizon could acquire competitors or their spectrum licenses in high-margin populated areas.

While most of the telecom industry struggles from an economic kick in the stomach, Verizon continues to operate profitably, although it also has felt effects. In February it announced that it would trim 6,000 jobs, primarily through attrition, and cut the equivalent of another 4,000 jobs by eliminating overtime and contract work. In March it reorganized its wireless unit, cutting 800 jobs and postponing a planned IPO until next year.

FUN FACT: *Verizon set aside $70 million for philanthropy in 2001, as one of the top 10 U.S. corporate foundations.*

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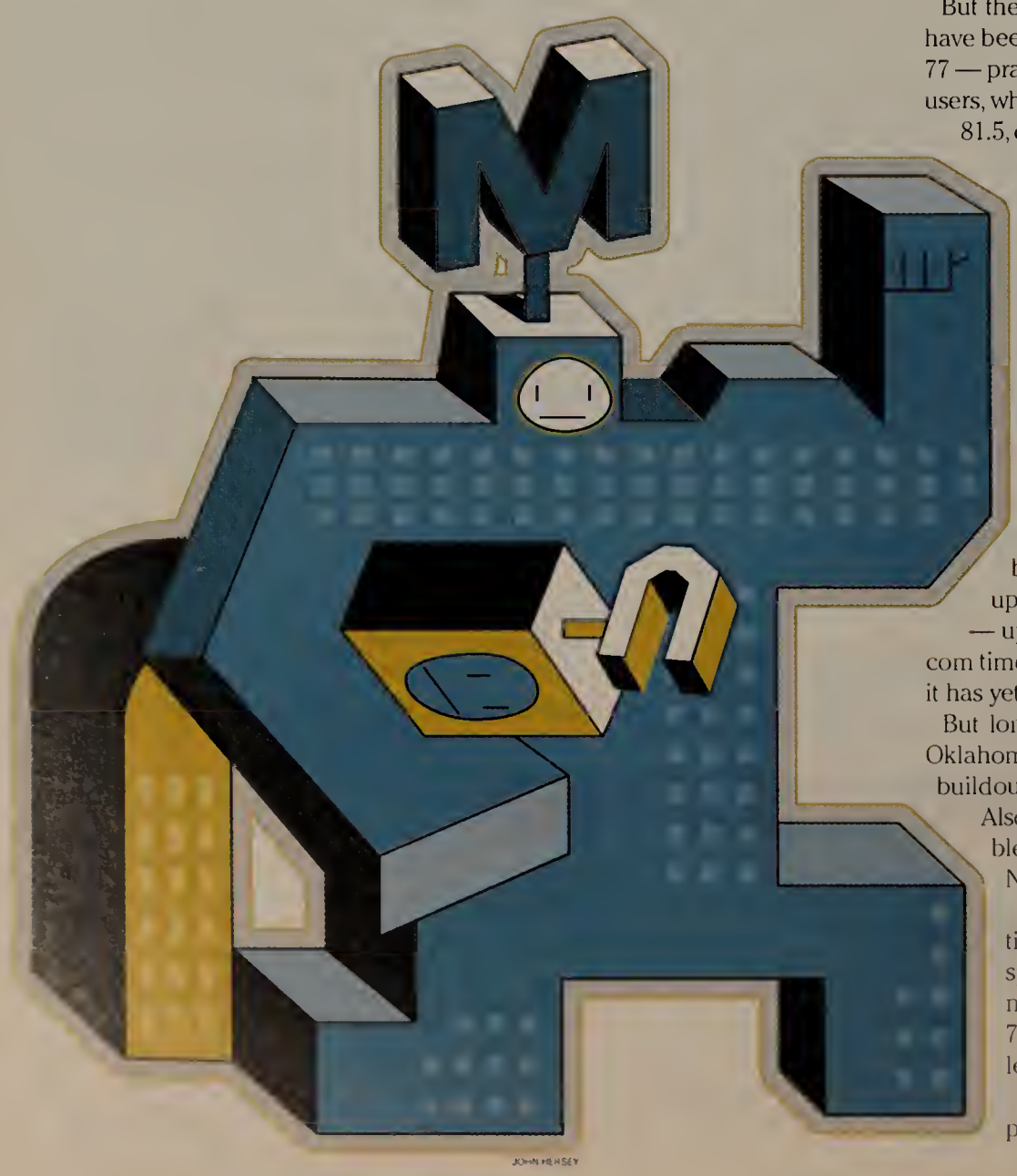
Company Power

Microsoft edges out Cisco for the top spo of the most powerful network companies.

Cisco loses face

BY JULIE BORT



JOHN HERSEY

What one hand giveth, the other taketh away.

Cisco's perch atop our annual Powerometer ranking of most powerful network companies was short-lived. After handing the title to the router king for the first time last year, the 250 *Network World* readers polled for this sixth annual survey restored the honor to its near-perennial holder, Microsoft.

But the match was so close that if our survey were a football game, Microsoft's finish would have been the Hail Mary play of the week. The software maker scored 77.2 compared to Cisco's 77 — practically a tie. Yet even a virtual tie represents a significant loss of face for Cisco among users, while Microsoft's power remains steady. Last year, Cisco earned a Powerometer score of 81.5, compared with Microsoft's 77.5.

The change illustrates how Cisco, one of the emblems of the New Economy (in its peak and crash) is no longer viewed as invincible. While respondents acknowledged Cisco's weakened state in 2001, they said it will rebound: 52% predict the company's power will rise in 2002.

Up-and-comers such as Alcatel are quickly slipping into the space created by Cisco's power reduction. True, Alcatel and Cisco aren't in the same league — Alcatel only ranked 22 out of 25. But its almost 9% year-to-year increase was the biggest percentage jump on the survey.

Among telecom providers, AT&T landed first, at No. 8, down two notches from last year. Clearly, the carrier faces many challenges, including its inability to stop incumbent local exchange carriers from gaining long-distance nods. Verizon, understandably, is gobbling up influence faster than a shark in a feeding frenzy. Its long-distance wins, charismatic leaders and enormous wireless reach helped it earn the survey's biggest leap in rank, a six-spot gain to No. 12. (CEO Ivan Seidenberg made a huge leap up the CEO Powerometer ranks, too. See story, page 46.) BellSouth also jumped the ranks — up four spots to No. 18 — in part because of its relative stability during these rocky telecom times (still in the black), and also from the noise it's making about long-distance, although it has yet to win any regulatory approvals.

But long-distance isn't enough. SBC Communications, which offers long-distance in Texas, Oklahoma and Kansas, still slid five spots. Huge layoffs and the foundering, once-hyped DSL buildout, Project Pronto, contributed to its shrunken stature.

Also understandably, telecom equipment manufacturers tanked. Lucent, constantly troubled this year, lost the most influence. A 20% drop in its score sunk it 14 spots to No. 23. Nortel lost 11%, dropping four spots to No. 14.

But do-it-all hardware/software giants IBM and Hewlett-Packard fared well. IBM in particular rushed for big yardage. On the strength of its technology, IBM scampered up four spots to No. 4. Recently, readers named its WebSphere servers, collocation facilities and network-attached storage products best in class (www.nwfusion.com, DocFinder: 7339). And HP climbed to No. 9 from No. 11. Besting both in gain is Network Associates, leaping six spots to No. 10 on its strength in the white-hot security market.

Overall, despite the troubled economy, seven of the 25 Powerometer vendors gained power in 2001. ■

ometer 2001:

while Cisco's rating drops a big 4.5 points in our annual reader survey

THE MOST POWERFUL COMPANIES

Using a mean scale of 1 to 100, 250 *Network World* readers ranked Cisco and Microsoft in a virtual power tie. They also considerably upped the power status of IBM, Network Associates and Verizon, and tanked Lucent.

2001 Rank	Company	2001 Power Rating	2000 Power Rating	Change	2000 Rank
1	Microsoft	77.2	77.5	0%	2
2	Cisco	77.0	81.5	-6%	1
3	Intel	70.6	74.6	-5%	3
4	IBM	68.3	64.3	6%	8
5	Oracle	64.1	68.5	-6%	4
6	Sun	62.7	67.2	-7%	5
7	Dell	61.8	64.5	-4%	7
8	AT&T	61.5	65.1	-6%	6
9	Hewlett-Packard	60.9	63.0	-3%	11
10	Network Associates	57.0	56.2	1%	16
11	EMC[1]	56.7	N/A	N/A	N/A
12	Verizon	56.6	54.2	4%	18
13	3Com	56.0	62.6	-11%	12
14	Nortel	56.0	63.2	-11%	10
15	Sprint	55.6	57.1	-3%	15
16	WorldCom	55.6	60.2	-8%	13
17	Compaq	54.8	56.0	-2%	17
18	BellSouth	54.3	50.3	8%	22
19	SBC	54.1	59.3	-9%	14
20	SAP	54.0	53.1	2%	20
21	Qwest	53.5	54.2	-1%	19
22	Alcatel	53.0	48.7	9%	23
23	Lucent	51.2	64.1	-20%	9
24	Computer Associates	50.9	51.2	-1%	21
25	Novell	50.0	47.4	6%	24

[1] Not on last year's list.

PACKING ON THE POWER

Only 7 companies gained power in 2001, respondents said.

2001 Rank	Company	2001 Power Rating	2000 Power Rating	Gain	2000 Rank
22	Alcatel	53.0	48.7	9%	23
18	BellSouth	54.3	50.3	8%	22
4	IBM	68.3	64.3	6%	8
25	Novell	50.0	47.4	6%	24
12	Verizon	56.6	54.2	4%	18
20	SAP	54.0	53.1	2%	20
10	Network Associates	57.0	56.2	1%	16

POWER DRAIN

While respondents lowered the scores of 17 out of 25 companies from 2000 to 2001, they only reduced the ranks of these 10 by 5% or more.

2001 Rank	Company	2001 Power Rating	2000 Power Rating	Loss	2000 Rank
23	Lucent	51.2	64.1	-20%	9
14	Nortel	56.0	63.2	-11%	10
13	3Com	56.0	62.6	-11%	12
19	SBC	54.1	59.3	-9%	14
16	WorldCom	55.6	60.2	-8%	13
6	Sun	62.7	67.2	-7%	5
5	Oracle	64.1	68.5	-6%	4
8	AT&T	61.5	65.1	-6%	6
2	Cisco	77.0	81.5	-6%	1
3	Intel	70.6	74.6	-5%	3

More online!

Go to the Power portal for additional survey results.

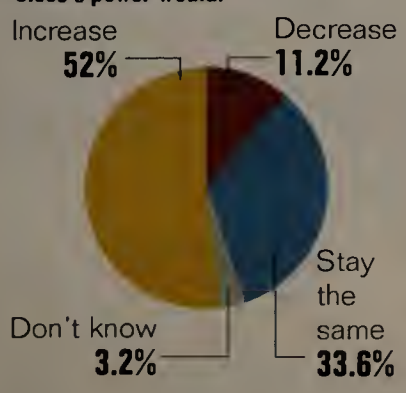
DocFinder: 7325

POWER IN FLUX Here's a look at the expectations survey respondents have of how various network companies will fare in the year ahead.

Cisco to recover

Slightly more than half of respondents expect Cisco to bounce back from its lousy year.

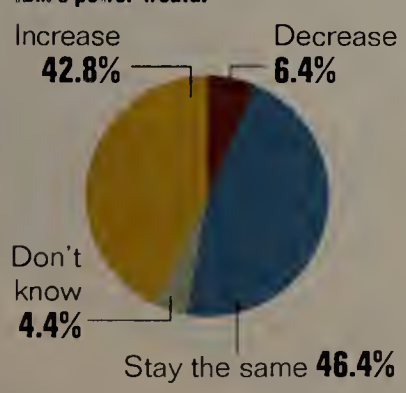
% of respondents who said Cisco's power would:



IBM to remain influential

Few respondents expect IBM to fumble away its large influence.

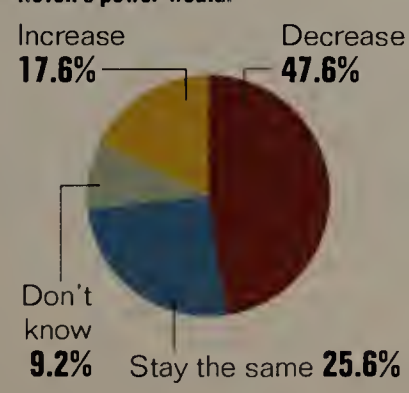
% of respondents who said IBM's power would:



Novell to dwindle further

Despite a slight increase in score this year, almost half of respondents see Novell's stature sinking.

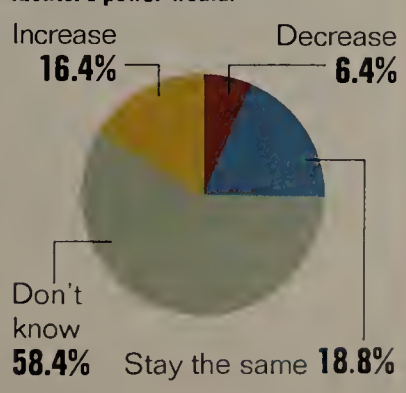
% of respondents who said Novell's power would:

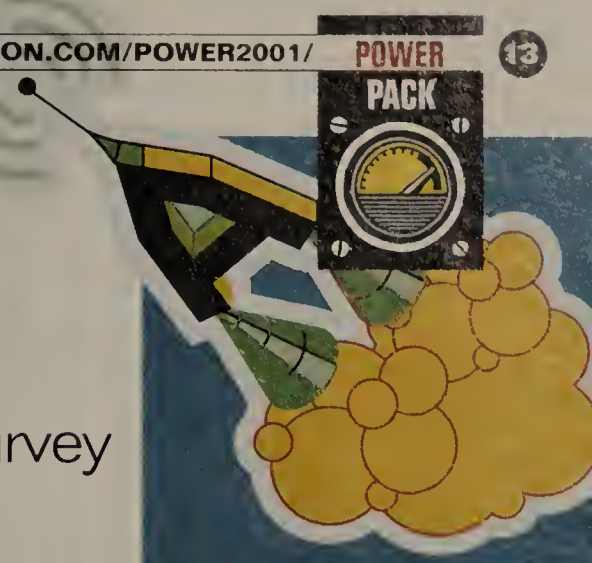


Alcatel to be tested

Alcatel hasn't yet convinced respondents that it can break into the big power leagues.

% of respondents who said Alcatel's power would:





Readers tell us who has clout

In our annual survey, 250 readers rank the power of 25 network vendors and their CEOs.

In this phone survey, conducted for *Network World* by Research Concepts in Berlin, Mass., 250 readers ranked a vendor's and CEO's power on a scale of 1 to 100, with 100 equaling most powerful (see story, page 46, for CEO rankings). Research Concepts then calculated the mean average, and we compared those averages against last year's. To chart historical performance, we use the same list of 25 vendors annually, until a vendor is acquired, goes out of business or is otherwise not an appropriate choice. We removed Cabletron this year because it split into four companies. This opened a slot for EMC, an editors' choice for our annual 10 most powerful companies in networking list for two years running (see story, page 7).

We queried readers from more than a dozen industries, from aerospace to utilities. Readers from the manufacturing, government and finance sectors contributed most — but still less than half — of the total responses. All respondents worked for companies with more than 1,000 employees and almost 40% worked for global firms that employ more than 20,000 people. (Demographic details are available on the Power portal, at www.nwfusion.com/power2001, DocFinder: 7325.)

— Julie Bort

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TECHNOLOGY

Web globalization promises powerful new business opportunities for companies that can effectively handle infrastructure updates, content management and language barriers.

Global empowerment

THE POWER OF TECHNOLOGY

A look into emerging technologies that promise to empower the enterprise.

- **GLOBAL EMPOWERMENT** See story this page.
- **TAKE A SIP** Page 21.
- **THE POWER OF MOBILITY** Page 24.

Albert Wahbe, executive vice president of electronic banking, helped take Scotiabank online and global — and in the process doubled revenue in the past three years.

Like many corporations, Canada's Scotiabank has global aspirations. And, naturally, it has turned to the Web for the power to meet those goals.

Scotiabank has consumer and business-to-business Web sites in 50 countries, several e-commerce services, and a 1-year-old subsidiary, e-Scotia, to drive further into e-commerce. "Our vision is to be the conduit for many e-commerce needs, not just banking, on a global scale," says Albert Wahbe, who orchestrated Scotiabank's e-business initiatives and conceptualized the e-Scotia plan while he was CIO. The bank has largely achieved that goal under Wahbe, who is now executive vice president of electronic banking at Scotiabank and CEO of e-Scotia. Its online businesses and international reach have helped Scotiabank double revenue from its traditional cash-management business in the past three years.

But knowing the CEO's global vision is one thing, developing to it is quite another.

Global goals, local ties

As they must with any satellite Web site residing outside the corporate network, network executives have to exert some control over the site and those responsible for administering it locally. The twist with globalization is the level of customization required in each locale.

Language is the most obvious hurdle. Makers of content management system (CMS) software — a staple for many Web operations — have only begun to add translation features. Corporations that have long since built out Web sites in other countries already had to make their support choices. They let each locale maintain its own Web site with oversight from central IT, or they maintain a centralized, English-only site that they update and disseminate. Scotiabank keeps a front end of marketing and other non-transactional material that is replicated to all sites. Each site prepares content updates, which a team in Toronto inspects for consistent branding and messaging. Pre-Web back-end customer-transaction systems remain housed in and specific to each country, Wahbe says.

Other corporations have circumvented the content quagmire by collapsing far-flung systems into one. That's what Honeywell Industrial Automation and Control (IAC) group did when it decided it could best serve its international customer and employee bases by consolidating roughly 17 sites into one domestically hosted site. The IAC group has to provide customers with information on service contracts, pricing agreements and repair requests. "There were a lot of inefficiencies before we consolidated," says Paul Orzeske, vice president of e-business at Honeywell IAC in Chicago.

Previously, international sites and databases

were independent, not synchronized with the Honeywell IAC network. Sales representatives fetched answers for customers primarily by e-mailing employees who had access to the inventory, pricing, contract or other databases. Those databases relied on a variety of incompatible software and platforms.

Now IAC's international Web infrastructure resides in its Phoenix data center, with one portal giving customers and employees secure access to the data they need, from wherever they are. The data center houses the myriad databases, along with 10 development and test servers and four production servers.

On the other side of the protected network sits one production server that receives batch updates of customer and product information from the data center's back-end databases and a CMS server, which acts as a communications interface between the databases and the public Web server.

Customers can retrieve answers themselves almost instantaneously. And by letting customers and employees access one server that receives batch updates from back-end databases, as opposed to having them access back-end systems with separate requests, IAC has improved performance while handling more requests, Orzeske says.

Documents without borders

Global e-commerce managers have learned that most effective sites are presented in local languages. "In order to sell products in some countries, you have to be perceived as a local company," says Tami Bernier, manager of Web technology at Redback Networks.

The company recently launched sites in China, Japan, South Korea and Taiwan that provide marketing and sales information in local languages. Redback relies on a centralized Web operation whose infrastructure remains largely untouched except for some tweaking of the directory structure supporting the sites.

That development work was made possible by globalization software. This relatively new type of application provides many of the functions of a CMS while smoothing the process of Web-page translation. Templates dictate page design, regardless of language, and let people translate pages without touching the format. The only additional hardware required to handle Redback's new sites was one server. Instead of storing the Web server and content database on one machine, Redback split them onto two to accommodate the rise in traffic.

The key to globalization software is XML, which lets documents be presented in a standard format, regardless of origin, and easily integrated into a Web site.

The same need exists for English-only sites. At Honeywell IAC, data comes from sources such as enterprise resource planning, financial and manufacturing applications that are scattered around legacy, Unix and Windows NT systems. With a CMS that can pull data from those systems and encapsulate them in XML, the incompatibility of the underlying file format becomes a nonissue when the data is passed into an XML-enabled Web system.

Without globalization software, corporations can still create international Web sites with little disturbance to the existing infrastructure. Companies that want to add international content yet keep servers and data stored in a central location can give users access to those servers through a directory tacked on to the existing site address. Unfortunately, e-commerce might require faster access to data than can be achieved by traversing many network hops across the globe. A company might need servers and content-routing equipment in each region. Web users could choose a specific language from the initial home page and be routed to the appropriate group of inter-

See Global, page 18

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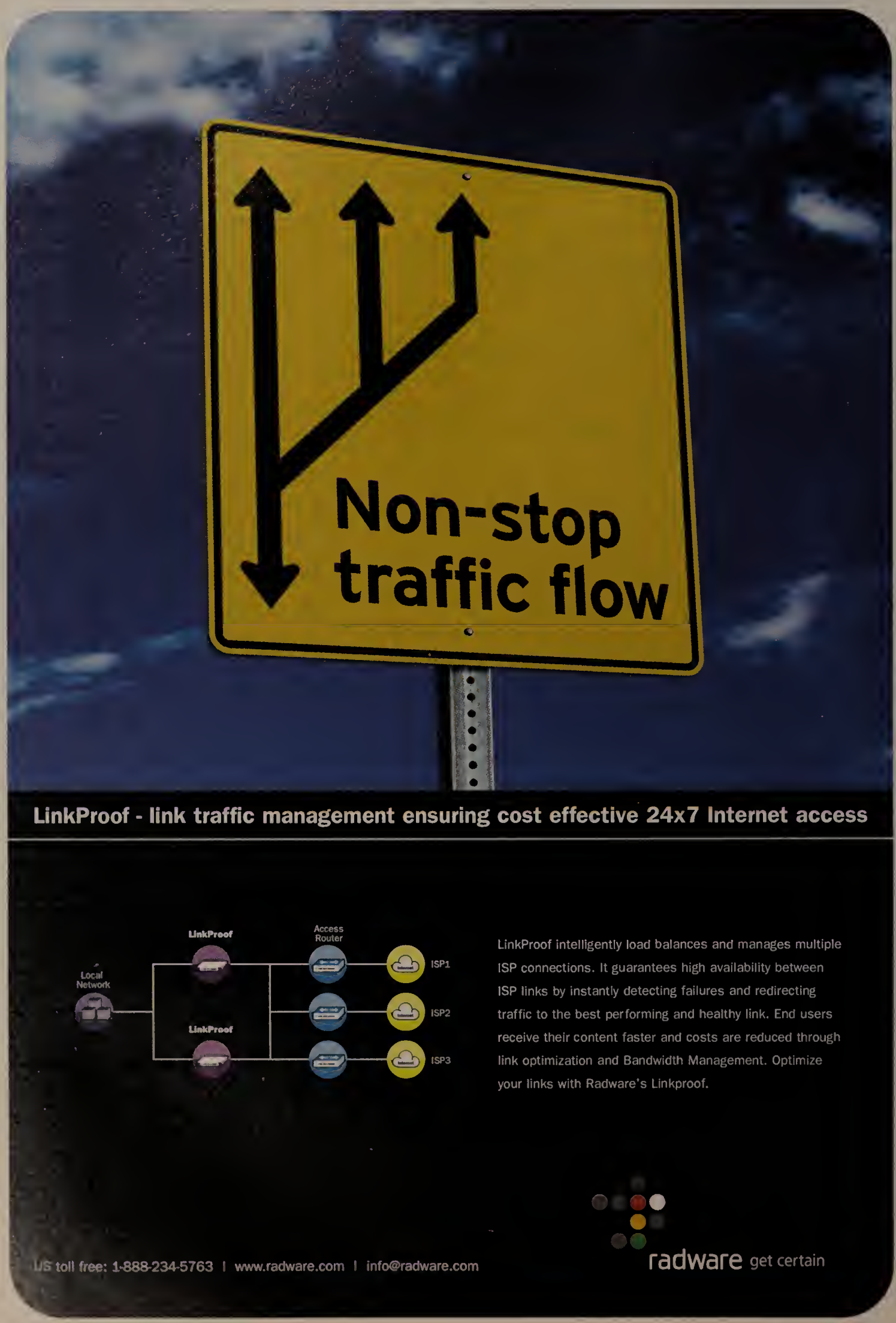
Global, continued from page 16

national servers housing the content in that language. Such a setup typically requires load-balancing routers at the central location to redirect traffic.

A more cost-effective method for speeding access while maintaining a Web infrastructure in one location is to use a caching service. Here, the Web request would go to the nearest cache server rather than to the central domestic location. This would minimize the infrastructure changes required for the new sites, keeping them in one location and reducing administration costs.

As many network executives have learned, maintaining international Web sites from a single data center will help keep globalization costs down. Of course, with that control comes the need for more programming sleight of hand to ensure data consistency in a number of languages and, in general, more rigorous site maintenance. No matter: The result can mean powerful new opportunities.

Mendel is a freelance writer in San Francisco. He can be reached at brett@mendel.net.



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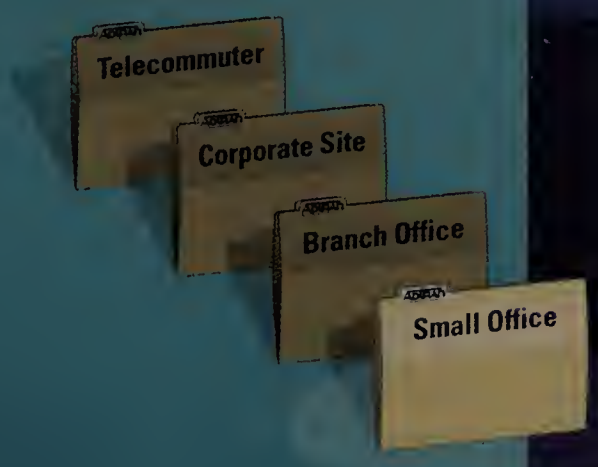

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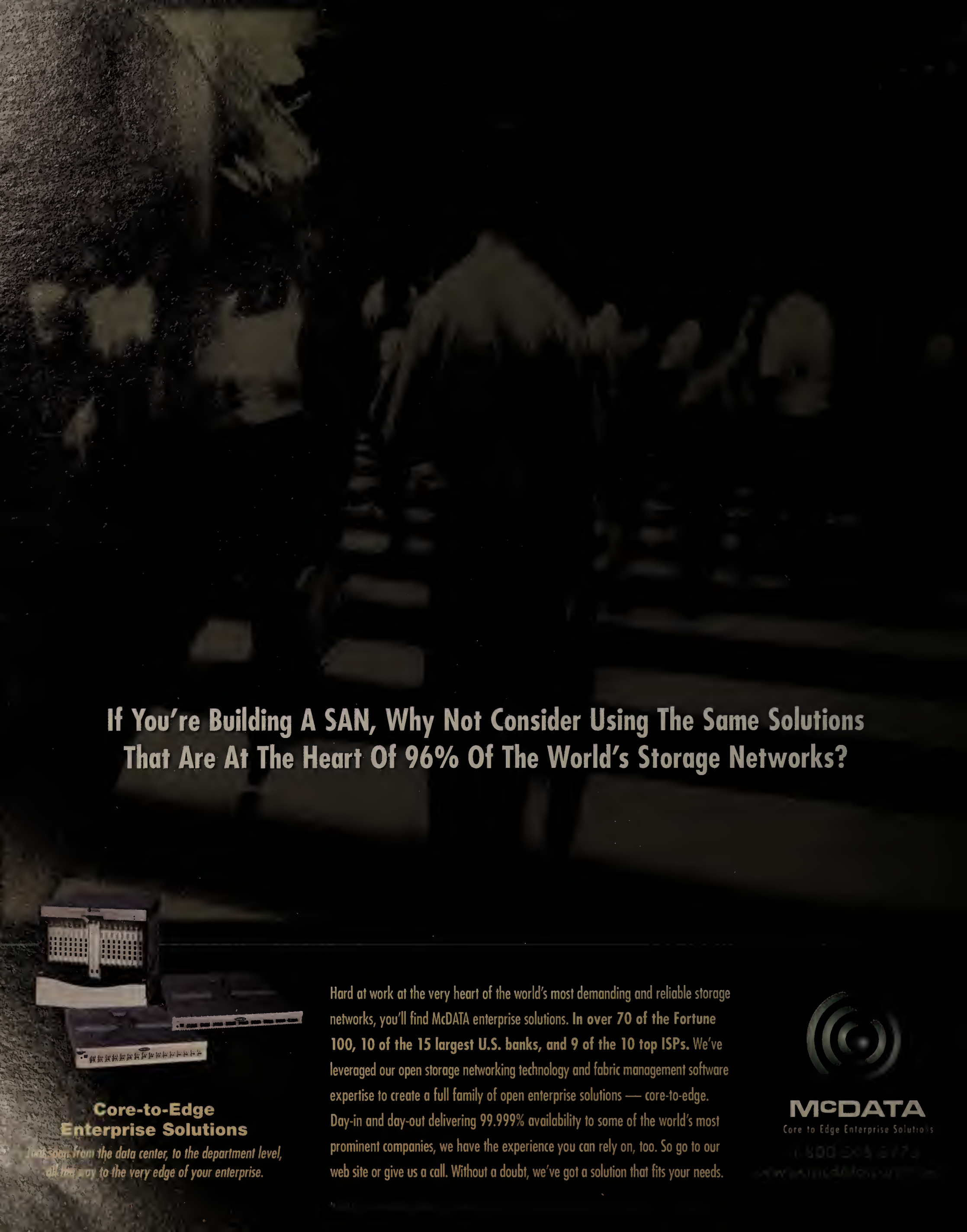
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TECHNOLOGY

Take a SIP

This IETF protocol promises to bring Ethernet-like interoperability to voice IP networks.

When Patrick Olson, CIO at Menlo College, makes a call on campus, chances are he's using a SIP-enabled phone.

THOMAS BOOTHE

BY PHIL HOCHMUTH

While Ethernet and IP have helped simplify data networking to the point of near-universal plug-and-play, getting different vendors' IP telephony wares to work together has been a trickier enterprise. But the IETF's Session Initiation Protocol holds great promise for changing that.

Users and industry watchers say SIP could empower telephony the way HTTP did the Web — make interoperability a given, while adding new features and applications. Unified voice, video and instant-messaging applications are in the offing, as are outsourced voice-over-IP services. Simply put, "voice should be an application on your network, just the same as e-mail," says Patrick Olson, CIO of Menlo College, an Atherton, Calif., school that runs a voice IP network. Just as e-mail clients from different vendors can communicate is how voice over IP should work, he adds.

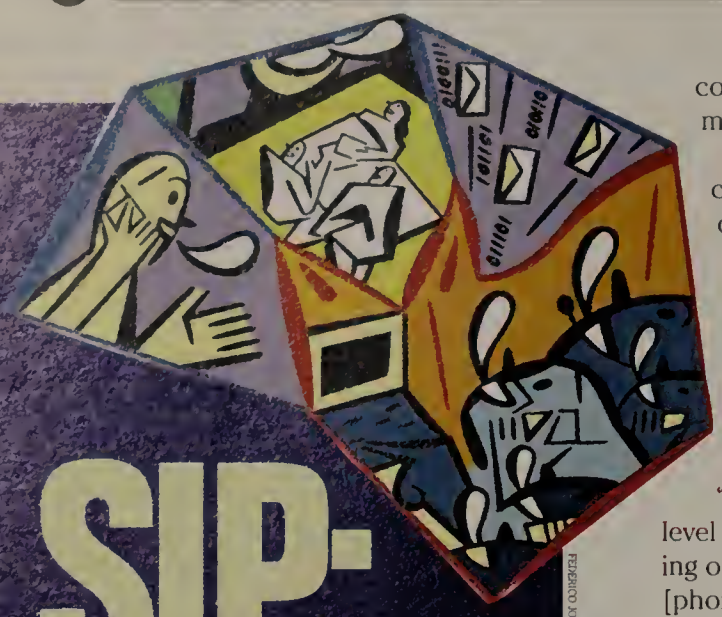
A SIP at a time

Today, much of SIP's promise for enterprise use resides in carrier voice-over-IP services. Through such services, network executives can forego installing PBX-based voice infrastructures for outsourced voice services delivered over IP.

Users get SIP-based IP phones and, in some cases, a voice over IP-enabled router or gateway from the carrier. All calls are processed on switches in the carrier's central office, as they are for traditional Centrex service.

WorldCom is preparing an outsourced voice-over-IP service — what it calls IP Centrex — for availability in January. It will use SIP-based phones and gateways from 3Com, Cisco and other vendors.

With a service such as the one planned by WorldCom, users not only could find contact phone numbers in a company directory, but also place the calls. They'd get unified messaging with a single in-box for voice, e-mail and fax. Calendar integration features would remind users of a phone meeting, then



FEDERICO JORDAN

SIP: Beyond the basics

Security and wireless enhancements are under way.

The basics are completed on the IETF's Session Initiation Protocol, so now come the enhancements. SIP crafters are focusing on two areas — security and wireless.

They have agreed on a standard way for SIP to traverse firewalls, says Henry Sinnreich, IETF member and a distinguished member of engineering with WorldCom. Vendor support is expected by early next year, he says. "Everyone in the firewall business will want to be compliant with SIP, especially now that it's been adopted by Microsoft [in Windows XP]," he says.

The working group also is developing SIP for 3G wireless applications such as packet voice and videoconferencing.

One serendipitous development in SIP/3G wireless is the fact that the shapers of 3G technology chose SIP from the start as the choice multimedia protocol for the new high-bandwidth wireless service, Sinnreich says. "That proved in hindsight to be a good idea. We didn't know at the time that the wireless [device] world would go with SIP," he says.

One 3G/SIP product that has already emerged is the Nokia Communicator, a PDA/cell phone hybrid that is capable of SIP-based instant text messaging. And Microsoft has promised that Windows CE devices such as the Pocket PC will be SIP-enabled in 2002.

— Phil Hochmuth

contact and set up all the parties, says Theresa Hastings, multimedia product engineering director for WorldCom.

With WorldCom's IP Centrex, users also will get more control over their voice network than they have with traditional Centrex. Through a Web interface, they can add and remove users or change features and applications. In the old Centrex world, these tasks could take weeks, Hastings says.

This self-provisioning will be the biggest plus over traditional Centrex, says Steve Blair, senior network engineer at the University of Pennsylvania, a beta-test site for WorldCom's IP Centrex service.

"We're hoping WorldCom's [IP Centrex] will provide the level of service our customers are asking for while improving our process for activating, changing and deactivating [phone] services on campus," Blair says. Of course, he adds, the university also is excited about the potential of not having to buy a new PBX or phone switch.

Besides WorldCom, carriers with SIP-based service plans include Broadwing, GoBeam, Net2Phone and TalkingNets.

SIP on the rise

For now, user organizations that prefer building their own voice IP networks are limited in their choices of SIP gear. Most major voice-over-IP vendors, including 3Com, Avaya, Cisco, Nortel and Polycom, rely on the ITU H.323 standard because it's been tried and proven in ISDN videoconference applications.

"[H.323] works, and it's deployed," says Tom Valovic, an analyst at IDC.

Some vendors also run proprietary protocols in their voice-over-IP gear. Cisco voice-over-IP phones and servers come with a default protocol called "Skinny." Users can choose among Skinny, H.323 and Media Gateway Control Protocol.

SIP can also co-exist in a network with Cisco CallManagers by adding a SIP proxy server, available from Cisco, 3Com and others. Open source options are also available for organizations that want to build their own SIP servers. Columbia University in New York has developed H.323-SIP gateway software that can be used to register SIP phones directly to a Cisco CallManager.

Menlo College uses Skinny and SIP. The school uses the default Skinny protocol on some Cisco 7960 IP phones because it's easier to deploy and manage on a LAN than SIP, and is less taxing on a CallManager server in terms of processing power, Olson says. But a majority of handsets rely on SIP via a server running Columbia's H.323-SIP software, which ties into CallManager. In a nutshell, "You can do more with SIP," he says.

In cases where voice-over-IP phone makers support or plan to support Java and XML, that means the option of developing special applications. Java applets running on SIP phones could deliver stock reports, the weather conditions or corporate announcements on the LCD. Or, using a SIP phone's touch screen, a teacher could enter daily class-attendance records into a database. The ability to use applications such as these on a voice IP network will eventually give SIP a leg up over H.323, experts say.

Another reason SIP has not yet broken the enterprise voice-over-IP market wide open is that the early voice-over-IP landscape has mirrored the traditional telecom model of closed systems, says Brian Strachman, a senior analyst with Cahners In-Stat.

"You can't have a system with a Nortel [IP PBX] and plug in Cisco or 3Com phones," Strachman says. "Frankly, most vendors don't want to be interoperable. No one wants to say, 'Go ahead and buy our IP PBX phone system, and oh, you can use Cisco or 3Com phones with it too.'"

Standard telecom practice in large companies has been to buy PBXs and phones from the same vendor, mostly for interoperability reasons.

"It's the telecom mindset, but it's been changing over the past five years," says Strachman, adding that SIP could become a driving force for making enterprise voice-over-IP networks as interoperable as Ethernet-based client/server LANs. "Eventually they will be open. You'll just have to give it a few years before you can go out and build a LAN telephony system piecemeal with phones and switches from different vendors."

Microsoft takes a big SIP

Vendor commitments to SIP are growing. Besides Cisco, Pingtel and Siemens already support the IETF protocol. Avaya says it plans to have SIP integrated into its IP600 IP PBX and phones by mid-2002. 3Com, which already sells SIP-based phones and SIP servers for service providers such as WorldCom, says it will support SIP in its enterprise NBX in 2002.

And Microsoft has thrown its considerable clout behind SIP by including the protocol as a piece of its new Windows XP operating system. The protocol carries IP voice and video traffic in the new Windows Messenger, an XP application for real-time voice, video and instant-messaging communications.

Windows Messenger not only will integrate multiple real-time communications applications, but also add "presence" to the software. Presence is an instant-messaging feature that notifies users who on their "buddy lists" is available to chat. Windows Messenger will use the SIP for Instant Messaging and Presence Leveraging (SIMPLE) extension to bring buddy lists to voice and video users registered on a service provider's network or in an enterprise environment.

> **"One of the biggest benefits of SIP is the addition of the SIMPLE extension [for instant messaging] and presence."**
>
> **Imad Yanni**
> Product manager for Windows XP, Microsoft

"One of the biggest benefits of SIP is the addition of the SIMPLE extension and presence," says Imad Yanni, product manager for XP at Microsoft. "In NetMeeting [Windows Communicator's H.323-based predecessor], it was difficult to find someone to start a session ... most people would end up calling each other first, then starting the [videoconference] meeting. And asking for someone's IP address is not practical."

Going one step beyond the "SIP on every desktop" future that it anticipates with XP, Microsoft also has outlined plans for Windows Real Time Collaboration, a SIP-based server application for letting many kinds of devices communicate. The SIP server could be used in a company as a voice, video and text messaging hub for myriad devices. Microsoft has not announced when it plans to release the product.

Menlo College's Olson likes the fact that his SIP-enabled network will be ready to handle new SIP applications, such as Windows Messenger in XP. Olson says he could see the school offering students the choice of an IP phone in their dorms or a phone application based on Windows Messenger and SIP.

"Ultimately what we want is interoperability so we can have anyone's phone, anyone's [IP voice] switch on our network," Olson says, noting that while Menlo College's voice-over-IP network is Cisco-centric now, he's looking to add Pingtel SIP phones soon.

What he wants, Olson says, is the ability going forward to pick and choose products from multiple vendors, whether he's looking for new features or lower prices. "SIP is what will let us do that." ■

More online!

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Power on the go

Wireless Web access revs up productivity and efficiency at early adopters. BY CASSIMIR MEDFORD

Standards and tools might be immature, service coverage spotty, client operating systems divergent, security a thorn and costs unpredictable, but a wide cross-section of enterprise users are embracing wireless data access.

Some network executives are willing to endure the pain of early adoption in exchange for the competitive advantages they say are inherent in wireless data access, especially the always-on mobility. "The tools are still immature, and techniques are still changing," says Rick Rawlings, IS director at Ray & Berndtson, an executive search firm in Fort Worth, Texas. Still, he suggests the firm's wireless project has been well worth it.

For one, sales partners have been more than excited about accessing the company's principle application, SearchNet, wirelessly. Most readily exchanged their Dell laptops for Compaq iPaq PDAs, Rawlings says. With the PDAs, the partners can use SearchNet discretely and almost instantaneously — they can get to the information they need in the time it would take just to get to a laptop's logon screen. Plus, the always-on feature keeps the partners current in an industry that profits from change.

SearchNet, which runs on a Citrix thin client/server system, is integrated with Microsoft Outlook, uses an Oracle 9i database and features a candidate registration system. Rawlings chose the Windows CE operating system because it could support the thin-client technology, with some customization, and the Oracle database.

The only additional element Ray & Berndtson needed was synchronization software because it has not yet found a carrier that can meet its coverage needs in eight U.S. cities, Rawlings says. For now, partners synchronize information with the company's server using tools from Synchrologic. They dial up or use a connection cradle.

Ray & Berndtson recently completed its rollout of the wireless system, issuing iPaqs to about 80 sales partners. Each setup cost about $600. The company also will issue each partner a Dell desktop, valued at about $2,000. "The desktop plus the iPaq and all its accessories adds up to about half the cost of a standard business-class laptop. Right there, the reallocation of our assets paid for the transition," Rawlings says.

Rick Rawlings, IS director at Ray & Berndtson, says the pain endured as an early wireless Web adopter has been well worth it.

Legal motion

Like Ray & Berndtson, Los Angeles law firm Paul, Hastings, Janofsky and Walker used its laptop refreshment budget to transition to wireless. In its case, a critical application has been adapted for use on the BlackBerry wireless handheld from Research in Motion and made available to 700 attorneys and support staff.

The firm chose wireless for almost the same reasons as Ray & Berndtson's. The attorneys considered laptops overkill — 90% of those who had laptops only used them for e-mail. Now attorneys get e-mail, faxes and voice mail via a universal in-box on the BlackBerry. It's ideal because it doesn't require synchronization with a host, says Mary Odson, the firm's CIO.

And it turned out to be a good deal for IT. "Upon issuing the BlackBerries, attorneys gave their laptops back," [illegible] our [return on investment]. [illegible] would [illegible]

BlackBerries [for support staff and researchers]," she notes.

Overall, the firm has reduced its laptop budget and the attendant "toll-free" dial-in costs by 30%, while its attorneys are more efficient and happier.

On the server side, the costs are relatively modest. The base server configuration with a 20-user license is about $3,000. Ongoing communications costs amount to approximately $40 per month, per user.

And for the first time, the firm will use a customer relationship management (CRM) application. It's chosen the InterAction CRM application designed for the BlackBerry by Interface Software.

Harvard goes wireless

Repurposing applications for wireless devices can pose more of a challenge than building wireless applications from scratch, but Harvard Medical School rose to it. Starting this fall semester, the school supports wireless Web access from all PDAs. Students and faculty can get access to the entire curriculum, class and faculty evaluations, schedules and events, and can share information via whiteboards. Doctors can write prescriptions and access patient records and lab results.

The project is the brainchild of Dr. John Halamka, associate dean of Harvard Medical School and CIO of CareGroup, an integrated delivery network of six hospitals in the Boston area. "Doctors and medical students are very mobile people, and we wanted to give them accessibility to all the business and educational processes and information when needed. I sent incoming students a letter saying, 'Bring whatever device you have,'" Halamka says.

About 160 students arrived at school with 27 different models of PDAs. "A browser solution allowed us to be device-neutral and standards-based. We also made it capable of synchronization and wireless communications," Halamka says. "We used a standard HTML set, JavaScript and [Secure Sockets Layer]."

Halamka uses the M-Business Server from Avant Go, a San Mateo, Calif., developer of software that [illegible] integration of wireless systems with existing [illegible] applications. Arcstream, a wireless systems [illegible] Watertown, Mass., worked with Harvard [illegible] tation. Internal IT is maintaining [illegible]

"Our benefits are the ability [illegible] any portable device via [illegible] Halamka says [illegible]

[illegible]

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B1201

1. What is the principal business activity at your location? (check ONE only)

01. ☐ Manufacturing (Non-Computer/ Communications OEM)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/ Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities/Process Industries (Mining/Construction/ Petroleum Refining/ Agriculture/Forestry)
10. ☐ Government/Military
11. ☐ Consulting (Independent) *
12. ☐ Education
13. ☐ Carriers/Voice/Data/ISP
14. ☐ Web Hosting/HSP
15. ☐ ASP/SSP/MSP
16. ☐ Manufacturing (Computer/ Communications/OEM)
17. ☐ Resellers/VARs/VADs/ Integrators/Distributors* (Computers/Communications)
18. ☐ Other (please specify) _____

*Attn Consultants, Integrators, Distributors, Resellers: Please complete form based on ALL clients and your own business needs

2. P: What is your primary job function? (check ONE only) S: What additional job functions are you involved in? (check ALL that apply)

P	S		P	S		P	S	
☐	☐	1. Network Management	☐	☐	4. Datacom/Telecom Management	☐	☐	7. Corporate Management (CEO, COO, CFO, Pres., VP, Dir., Mgr.)
☐	☐	2. CIO/CTO/IS/IT/MIS/ Systems Management	☐	☐	5. Internet/Intranet/Web/ E-Commerce Management	☐	☐	8. Consultant (Independent)
☐	☐	3. LAN Management	☐	☐	6. Engineering Management	☐	☐	9. Other (please specify) _____

3. What is the estimated value of network equipment and services that you specify, recommend, or approve the purchase of? (Please print the appropriate number code on the line next to each product category. Please complete ALL categories A–O.)

1. $100 Million or more
2. $50 Million to $99.9 Million
3. $25 Million to $49.9 Million
4. $10 Million to $24.9 Million
5. $1 Million to $9.9 Million
6. $100,000 to $999,999
7. $50,000 to $99,999
8. Under $50,000
9. None of the above

A ____ Large Systems *(Mainfromes/Minis)*
B ____ Desktops *(Micros/Laptops/ Workstotions)*
C ____ Mobile *(including PDAs, Wireless)*
D ____ Servers
E ____ LANs
F ____ WAN Equipment
G ____ Carrier Services
H ____ Internet/Web/E-commerce
I ____ Intranet/Extranet
J ____ Internetworking *(including Routers, Switches)*
K ____ Storage
L ____ Remote Access
M ____ Peripherals
N ____ Software
O ____ Service/Support Services

4. What is the total number of sites for which you have purchase influence? (check ONE only)

1. ☐ 100+ 2. ☐ 50 to 99 3. ☐ 20 to 49 4. ☐ 10 to 19 5. ☐ 2 to 9 6. ☐ 1 7. ☐ None

8. Please indicate the Web/Security/LAN/Internetworking/Wireless/Mobile/WAN Equipment/ Carrier Services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

WEB

A	B		A	B		A	B	
☐	☐	01. Web Servers/Software	☐	☐	04. Web Development Tools	☐	☐	07. Web Acceleration/Caching/ Load Balancing
☐	☐	02. Web Traffic Management	☐	☐	05. Web Content Management	☐	☐	08. Web Hosting Services
☐	☐	03. Electronic Commerce Tools	☐	☐	06. Web Collaboration/ Groupware	☐	☐	09. Other

SECURITY

A	B		A	B		A	B	
☐	☐	10. Firewalls	☐	☐	13. DES Encryption Tools	☐	☐	16. Certificate Authorities
☐	☐	11. Anti-Virus Software	☐	☐	14. Authentication Tools	☐	☐	17. Biometrics
☐	☐	12. Private Key Encryption Tools	☐	☐	15. Intrusion Detection	☐	☐	18. Other

LANs/INTERNETWORKING

A	B		A	B		A	B	
☐	☐	19. Fast Ethernet	☐	☐	26. Storage Backup (Optical, Disk, Tape, RAID)	☐	☐	30. Hubs/Intelligent Hubs/ Stackable Hubs
☐	☐	20. Gigabit Ethernet	☐	☐	27. Network Test/Diagnostic Tools	☐	☐	31. Cables,Connectors, Baluns
☐	☐	21. Layer 3-7 Switches	☐	☐	28. Uninterruptable Power Supplies (UPS)	☐	☐	32. Wiring/Fiber Systems
☐	☐	22. ATM Switches	☐	☐	29. Network Interface Cards (NICs, PCMCIA)	☐	☐	33. Net Management Systems
☐	☐	23. Routers				☐	☐	34. Voice Over IP (VoIP) Tools
☐	☐	24. Network Attached Storage (NAS)				☐	☐	35. Network Analyzers
☐	☐	25. Storage Area Networks (SANs)				☐	☐	36. Other Local-Area Network/ Internetworking

WIRELESS/MOBILE

A	B		A	B		A	B	
☐	☐	37. Wireless LANS	☐	☐	39. Wireless LAN Extension Tools	☐	☐	41. PDAs
☐	☐	38. Wireless/Cell Phones	☐	☐	40. Mobile Data Equipment/Services	☐	☐	42. Other Remote/Wireless

WAN EQUIPMENT

A	B		A	B		A	B	
☐	☐	43. Frame Relay Equipment	☐	☐	48. Voice/Video over IP Gateways	☐	☐	53. DSUs/CSUs
☐	☐	44. Bandwidth Managers	☐	☐	49. Modems	☐	☐	54. PBXs
☐	☐	45. Bandwidth Shaping/QOS Tools	☐	☐	50. Cable Modems	☐	☐	55. Call Center Tools
☐	☐	46. VPN Equipment	☐	☐	51. xDSL Products	☐	☐	56. Videoconferencing Gear
☐	☐	47. ATM Switches	☐	☐	52. Diagnostic/Test Equipment	☐	☐	57. ISDN Equipment/Services
						☐	☐	58. Other WAN Equipment/Services

CARRIER SERVICES

A	B		A	B		A	B	
☐	☐	59. Internet Access	☐	☐	64. ATM Services	☐	☐	69. Wavelength Services
☐	☐	60. Private Lines	☐	☐	65. Managed Services	☐	☐	70. Dark Fiber
☐	☐	61. Frame Relay Services	☐	☐	66. VPN Services	☐	☐	71. Other Carrier Services
☐	☐	62. ADSL/DSL	☐	☐	67. LAN-Extension Services			A B
☐	☐	63. T-1/T-3 Services	☐	☐	68. OC-3/OC-12			None of the above (1 – 71) ☐ ☐ 72.

9. Please indicate the Systems/Peripherals/Software/Applications/Business Services that you are currently involved in purchasing or plan to purchase: (check ALL that apply)

A. Currently involved in purchasing B. Plan to purchase

SYSTEMS/PERIPHERALS

A	B		A	B		A	B	
☐	☐	01. Laptops/Notebooks	☐	☐	06. Fax Servers	☐	☐	10. Mainframes
☐	☐	02. Desktops	☐	☐	07. Remote Access Servers	☐	☐	11. Printers
☐	☐	03. Intel-Based Servers	☐	☐	08. Video Servers	☐	☐	12. Enclosures/Racks/Furniture
☐	☐	04. Risc-Based Servers	☐	☐	09. Mid-Range Systems (including workstations)	☐	☐	13. Other Computers/ Peripherals
☐	☐	05. Print Servers						

SOFTWARE/APPLICATIONS

A	B		A	B		A	B	
☐	☐	14. Desktop/Server Operating Systems	☐	☐	20. Database Management Systems	☐	☐	25. Middleware
☐	☐	15. Network Management	☐	☐	21. Customer Resource Management (CRM)	☐	☐	26. Document Management Tools
☐	☐	16. Systems Management	☐	☐	22. Enterprise Resource Planning (ERP)	☐	☐	27. Site Metering Tools
☐	☐	17. Directory Services	☐	☐	23. XML Tools	☐	☐	28. Software Distribution Tools
☐	☐	18. E-Mail	☐	☐	24. Desktop Videoconferencing	☐	☐	29. Data Warehousing
☐	☐	19. Groupware				☐	☐	30. Applications Development Tools
						☐	☐	31. Other Software/Applications

BUSINESS SERVICES

A	B		A	B		A	B	
☐	☐	32. Application Service Provider Services	☐	☐	33. Systems Integration/ Consulting	☐	☐	35. Other Services
			☐	☐	34. Education/Training Services			A B
								None of the above (1 – 35) ☐ ☐ 36.

10. Please indicate the platforms that are currently installed/planned: (check ALL that apply)

A. Currently installed B. Planned for purchase

NETWORK PROTOCOLS

A	B		A	B		A	B	
☐	☐	01. TCP/IP v4	☐	☐	03. SNA/APPC/APPN/LU6.2	☐	☐	05. NETBIOS/NETBUEI
☐	☐	02. TCP/IP v6	☐	☐	04. Novell IPX/SPX	☐	☐	06. NFS
						☐	☐	07. Other Network Protocols

LAN/WAN ENVIRONMENT

A	B		A	B		A	B	
☐	☐	08. Gigabit Ethernet	☐	☐	13. Token Ring/Token Ring Switching	☐	☐	18. DSL
☐	☐	09. Switched Ethernet	☐	☐	14. Layer 3-7 Switching	☐	☐	19. ISDN
☐	☐	10. Fast Ethernet	☐	☐	15. FDDI	☐	☐	20. Frame Relay
☐	☐	11. Ethernet	☐	☐	16. Fibre Channel	☐	☐	21. Private Line T1, T3, OC-3, OC-12
☐	☐	12. ATM	☐	☐	17. Wireless LANs	☐	☐	22. Other LAN/WAN Environment

DESKTOP/SERVER OPERATING SYSTEMS

A	B		A	B		A	B	
☐	☐	23. Windows 2000	☐	☐	28. Intel based UNIX	☐	☐	34. Palm OS
☐	☐	24. Windows 95/98	☐	☐	29. RISC based UNIX (incl. SOLARIS)	☐	☐	35. Windows CE
☐	☐	25. Windows NT/Windows 2000	☐	☐	30. IBM MVS/VM/VSE/ESA	☐	☐	36. Other Network Operating System
☐	☐	26. Novell (NetWare 5.X, 4.X, 3.X, 2.X)	☐	☐	31. OS/400			A B
☐	☐	27. LINUX	☐	☐	32. Digital VMS			None of the above (1– 36) ☐ ☐ 37.
			☐	☐	33. Macintosh			

Continued on next page...

Continued from page one...

5. What is the total number of Servers/Clients installed/planned at your location/in your entire organization? (check ONE box in each column)

	SERVERS		CLIENTS	
	At Location (A)	Entire Org. (B)	At Location (C)	Entire Org. (D)
1.	☐ 50,000+	☐	☐ 50,000+	☐
2.	☐ 10,000 to 49,999	☐	☐ 10,000 to 49,999	☐
3.	☐ 1,000 to 9,999	☐	☐ 1,000 to 9,999	☐
4.	☐ 100 to 999	☐	☐ 100 to 999	☐
5.	☐ 50 to 99	☐	☐ 50 to 99	☐
6.	☐ 10 to 49	☐	☐ 10 to 49	☐
7.	☐ 1 to 9	☐	☐ 1 to 9	☐
8.	☐ none	☐	☐ none	☐

6. What is your scope and involvement in purchasing decisions for network products and services for your enterprise?

A. Scope (check ONE only)

CORPORATE/ENTERPRISE:

1. ☐ Entire Enterprise/ Multiple Enterprises
2. ☐ Multinational Enterprise
3. ☐ Division/Multiple Divisions
4. ☐ Department
5. ☐ None

B. Involvement (check ALL that apply)

1. ☐ Create Network/IT Strategy
2. ☐ Recommend/Specify Brand
3. ☐ Approve Purchase
4. ☐ Evaluate Products/Services
5. ☐ Determine the Need
6. ☐ None

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7. What is the estimated number of employees in your entire organization/at your location? (check ONE in each section)

A. Entire organization:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 499 or less

B. At your location:

1. ☐ Over 20,000
2. ☐ 10,000 – 19,999
3. ☐ 5,000 – 9,999
4. ☐ 2,500 – 4,999
5. ☐ 1,000 – 2,499
6. ☐ 500 – 999
7. ☐ 250 – 499
8. ☐ 100 – 249
9. ☐ 99 or less

11. Which of the following hardware platforms are installed/planned in your company? (check ALL that apply)

A - Servers

1. ☐ IBM (Mainframes)
2. ☐ IBM RS/6000
3. ☐ IBM AS/400
4. ☐ Compaq/Digital/ Tandem
5. ☐ Unisys
6. ☐ H-P
7. ☐ Other

B - Workstations/Desktops/Laptops

1. ☐ Sun Microsystems
2. ☐ H-P
3. ☐ Compaq/Digital
4. ☐ IBM
5. ☐ Dell
6. ☐ Gateway
7. ☐ Fujitsu
8. ☐ Other

12. What is the estimated gross revenue of your entire company/institution? (check ONE only)

1. ☐ $20 Billion or More
2. ☐ $10 Billion to $19.9 Billion
3. ☐ $1 Billion to $9.9 Billion
4. ☐ $500 Million to $999.9 Million
5. ☐ $100 Million to $499.9 Million
6. ☐ $50 Million to $99.9 Million
7. ☐ $10 Million to $49.9 Million
8. ☐ $5 Million to $9.9 Million
9. ☐ $4.9 Million or Less
10. ☐ None of the above

13. For which areas outside of the U.S.A. do you have purchase influence? (check ALL that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ Africa
7. ☐ Canada
8. ☐ None

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The 50 most powerful people in networking

PROFILES IN POWER

Our guide to the most powerful people in the network industry.

- THE 50 MOST POWERFUL PEOPLE See story this page.
- AT&T'S NEXT-IN-COMMAND Page 36.
- CISCO'S DEVELOPMENT HOPE Page 38.
- IBM'S CEO-IN-WAITING Page 40.
- MICROSOFT'S .NET APOSTLE Page 43.
- VERIZON'S MASTER BUILDER Page 45.
- THE 2001 CEO POWEROMETER Page 46.

BY ANN BEDNARZ AND JULIE BORT

Professional athletes play the game, but they don't make the rules. Without owners, coaches and league officials, there would be no professional sports.

Likewise, vendor power brokers couldn't exist without their owners — the corporate users who buy their wares and pay their salaries. Without standard-setters to assist product development and policy-makers to shape the rules, there wouldn't be much of a market.

And just as television executives flood teams with money and media keep up the color commentary, the IT industry has its venture capitalists to float newcomers and analysts to sort through the hype.

The *Network World* staff and trusted advisors voted to single out these 50 individuals. From product development choices to enterprise deployment decisions, they control the ball when it comes to networking.

POWER Executives

The economy dashed many a network hope this year but buoyed as many others. In acknowledgement of the industry turbulence and new business conditions, we did not place perennial favorites such as Cisco CEO John Chambers and Microsoft CEO Steve Ballmer on our annual most powerful vendor executives' list. As the heads of network powerhouse companies, their power goes unquestioned. Rather than rehashing their prowess, we focused on the lesser-known people promising niche markets or those charged with executing top vendors' critical plans.

Pekka Ala-Pietila

PRESIDENT, NOKIA

Ala-Pietila is perhaps the most powerful champion of the wireless Web. Seeing it as the future for growth at Nokia, he's thrown the company's considerable engineering prowess at it from every angle: phones, Java development, security, standards, wireless LANs and other network equipment (Nokia has about 20,000 engineers on its payroll). Along the way, he's made Nokia a quiet infrastructure powerhouse.

Marc Benioff

FOUNDER AND CHAIRMAN, SALESFORCE.COM

Customer relationship management software is hot, but expensive. Enter Benioff and his application service provider-model salesforce.com, an alternative he claims is priced at about 10% of the total cost of ownership of a software package. Benioff learned the ropes at Oracle, his last position as a senior vice president. But Benioff doesn't fit the ruthless Oracle-executive mold — he once won the True Friend of the User Community Award from Oracle's International User Group.

Bill Coleman

FOUNDER AND CHIEF STRATEGY OFFICER, BEA SYSTEMS

Coleman, a 27-year industry veteran, brings the get-there-first-and-stay-there attitude he learned as chief of satellite operations in the U.S. Air Force to his business endeavors. This summer, he added another first-to-market to his bragging rights by shipping a version of the WebLogic application server that supports Web services standards. This helped cement WebLogic's place as the No. 1 Java 2 Enterprise Edition Web application server, with 37% of installations, according to Meta Group. Coleman, who handed over the CEO hat to co-founder Alfred Chuang in October, now concentrates on executing his vision for Java development. That includes finding ways to compete with big-league software players Hewlett-Packard, IBM, Oracle, Microsoft and Sun.

Dave Dorman

PRESIDENT, AT&T

Just one year ago, Dorman became AT&T president, a position most telecommunications veterans would jump at given the chance. And now it seems he's poised for even more power. C. Michael Armstrong has indicated that he'll likely retire as CEO in 2002, and most industry watchers consider Dorman next in line for that job. (See full profile, page 36.)

Sandra England

EXECUTIVE VICE PRESIDENT OF BUSINESS DEVELOPMENT AND STRATEGIC RESEARCH, NETWORK ASSOCIATES

In November, Network Associates' PGP unit got the ax, with products such as the Gauntlet Firewall getting snuffed out or moved into other product groups. But the fate of that group's head, England, was not dire at all. She's taken on the critical role as technology scout, seeking out potential acquisitions and strategic partnerships while overseeing the company's research organization. The poised England frequently makes rounds on the speakers' circuit and has testified before Congress on the impact of viruses.

Henry Fiallo

CEO, ENTERASYS NETWORKS

Fiallo is making the most of Enterasys' fresh start as a Cabletron spinoff. He's pushed Enterasys into garnering 33.2% of worldwide modular Layer 3 ports shipped for the third quarter of 2001, according to Dell'Oro Group. The rise of

respect for Enterasys has much to do with Fiallo's past as a CIO, a post he held at Cabletron, and before that at power company Entergy Services. The skills of vending a product are not the same as consuming it, but when an executive can meld the two successfully, power is the result. Fiallo has the markings of one who can do so.

Mark Floyd

PRESIDENT AND CEO, SIEMENS INFORMATION AND COMMUNICATION NETWORKS

If ever a door to the U.S. telecommunications equipment business stood open, it does now, and Floyd aims to stride through it. A highly regarded network entrepreneur, he joined Siemens ICN in April with the company's acquisition of Efficient Networks, which he founded and led. When the board appointed him CEO five months later, they made his orders clear: Restructure the $2 billion telecom equipment provider to grab more of the U.S. market while Lucent and other competitors are weak. Floyd has restructuring experience on his side. Three years after starting Efficient, he shifted its focus from ATM switches and routers for computer vendors to DSL devices for users.

Russ Holt and Randy Groves

CO-VICE PRESIDENTS, DELL'S ENTERPRISE SYSTEMS GROUP

Dell is giving the enterprise server market a double-whammy in Holt (left) and Groves. Holt, the former vice president and general manager of Dell's Storage Systems Group, is credited with turning Dell's storage into a $1.5 billion business, largely by declaring network-attached storage a commodity market and pricing accordingly. Groves, the former vice president of Dell's High Volume Server Systems Group, helped lead Dell to its No. 1 position in Intel-based servers in the U.S. A 21-year IBM veteran before joining Dell in 2000, Groves was responsible for developing IBM's Netfinity line.

Sanjay Kumar

CEO, COMPUTER ASSOCIATES

Any CEO who takes over for the founder is straddling a bucking bronco. But Kumar held onto his mount during his first full year, despite a bitter proxy fight initiated by a major investor for board control. If that investor had won the fight, he presumably would have axed Kumar and Chairman Charles Wang. Kumar is exerting his influence by trying to reverse CA's bully image. This year Kumar addressed, at least in part, long-standing complaints on licensing practices. He created an option to long-term software licenses in the form of a flexible application service provider model with monthly fees.

Mike Lazaridis

FOUNDER, CO-CEO AND PRESIDENT, RESEARCH IN MOTION

The technical visionary behind RIM, Lazaridis shepherded the popular BlackBerry wireless device into the corporate market, where it's been met with almost cult-like devotion. As of October, RIM claimed more than 12,000 corporate customers, many of them using the technology to deliver customized applications to mobile workers. A consummate engineer, Lazaridis holds several patents for software code and wireless technology and even has an Emmy for designs in computer film-editing equipment.

Toni Li

FOUNDER AND CHIEF SCIENTIST, PROCKET NETWORKS

Li is the golden boy of network engineering, having helped architect some of Cisco's and Juniper Networks' prize routing technologies. Industry watchers expect Li to take on his former employers with the routing technology they believe is under development at Procket, one of *Network World's* 10 start-ups to watch in 2001 (see www.nwfusion.com, DocFinder: 7334).

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Drew Major
CTO, VOLERA

Major has long claimed a place among network industry visionaries. As the creator of NetWare, he was the guiding force behind all of Novell's technologies. He has since turned his attention to caching through Volera, spun off from Novell in February. Major has a loyal user following and many believe his caching products will eventually become as popular as NetWare. Besides his work at Volera, Major is funding a secretive company called XLON Technologies that is creating ways to move multimedia and other large files quickly across the 'Net.

Mario Mazzola
CHIEF DEVELOPMENT OFFICER, CISCO

Mazzola holds one of the most critical roles coming out of Cisco's reorganization into major technology groups. He's coordinating development efforts across all 11 of those groups, finding synergies across a broad product line and directing the massive resources available to Cisco. (See full profile, page 38.)

John McHale
FOUNDER, CEO AND CHAIRMAN, TIPPINGPOINT TECHNOLOGIES

McHale is one of those multiple-start-up success stories. He founded Ethernet vendor NetWorth, which Compaq bought in 1995. He followed that with NetSpeed, a DSL company he sold to Cisco in 1998. He's back to try his hand with TippingPoint Technologies, which offers a package of network products, open development tools and hosted services that let service providers deploy new networks and services quickly. TippingPoint is selling into a hurting market and is financially struggling. Still, if anyone can make the company work, the golden-touch McHale can. He moonlights as a partner with venture capitalist firm Austin Ventures, known for seeding companies such as SynOptics and EMC spinoff McData.

Joe Nacchio
CEO, QWEST COMMUNICATIONS

Nacchio's star has risen so fast and so high that in 2001 he took on the people that make most CEOs quiver: financial analysts. Last summer, three Morgan Stanley analysts questioned the company's accounting practices. No kowtowing or peacemaking for Nacchio; on a conference call with the financial community he angrily — and loudly — defended Qwest. The horns-forward Nacchio is the image forever locked in our imagination. Even though the debt-burdened Qwest is struggling to turn a profit, Nacchio's guts seem well-matched with his business acumen.

Dave Roberson
COO, HITACHI DATA SYSTEMS

Roberson has been the deal maker and execution man in HDS' conversion into a storage powerhouse. Roberson, a 20-year HDS veteran, led the Hitachi subsidiary from its roots as a traditional Japanese manufacturing company into an American-style vendor of products and services. In August, he harvested one of the heftiest fruits of that change, when HDS struck a multibillion dollar deal that has Sun reselling Hitachi storage products and the two co-developing high-end storage for the data center and investing in support centers.

Ray Ozzie
CEO, GROOVE NETWORKS

Despite receiving loads of accolades and attention, Ozzie, of Lotus Notes fame, is notoriously polite. Today, Groove Networks and its peer-to-peer collaboration platform has put Ozzie back in the spotlight. Ozzie gives velocity to Groove, named one of *Network World's* 10 start-ups to watch for 2001 (see www.nwfusion.com, DocFinder: 7334). The company signed on 200 partners within six months of shipping in March and some big-name enterprise customers.

Sam Palmisano
PRESIDENT AND COO, IBM

Twenty-eight years at Big Blue and Palmisano is poised to take over the top spot that observers say is sure to open when CEO Lou Gerstner's contract expires in March. At 60, Gerstner is at the age when all senior IBM executives have retired over the past 30 years. Palmisano has been Gerstner's right-hand man since Day 1, and long considered his heir-apparent. (See full profile, page 40.)

Jerry Parrick
CEO, YIPES COMMUNICATIONS

Parrick would be the stereotypical entrepreneur, a cross between an inventor and an engineer, if he weren't a proven businessman with a decade-long track record. He is known for building one data organization after another, first at Pacific Bell, then US West and then Nokia. Now if Parrick can avoid the cash crunch that poisoned the competitive local exchange carrier industry, he has a shot at creating a serious Ethernet services competitor.

Greg Reyes
CEO, BROCADE COMMUNICATIONS SYSTEMS

Reyes has proven himself to be the right man for creating a world-class competitor out of a start-up. Following his aspiration to be the CEO of a major technology company, he joined Brocade in 1998.

At $24 million in sales, Brocade wasn't that large, so Reyes made it so, guiding the company to $513 million in fiscal 2001. He made a decent profit while doubling investment in research and development. In the process, he snatched up more than 60% of the Fibre Channel hub and switch market, according to IDC.

Eric Rudder
SENIOR VICE PRESIDENT OF DEVELOPER AND PLATFORM EVANGELISM, MICROSOFT

Rudder heads the first and arguably most crucial step in Microsoft's .Net program. He must educate, convert and nurture more than 6 million developers on .Net, the bet-the-company strategy to deliver software as a set of services over the Internet that Rudder spent four advisory years helping Gates devise. (See full profile, page 43.)

Bruce Schneier
FOUNDER AND CTO, COUNTERPANE INTERNET SECURITY

Encryption guru Schneier has long been a power to reckon with in security circles. He designed the Blowfish and Twofish encryption algorithms, has penned six books, including one used as a cryptography textbook, and has openly criticized Microsoft and other software vendors for releasing unsafe code.

Counterpane, a 24-7 security monitoring service, is his attempt to practice what he preaches. He envisions his security monitoring service as a way out of the software security patch treadmill. Counterpane has grabbed several significant reseller partners, including Cisco and NEC Business Network Solutions.

Ivan Seidenberg
CO-CEO, VERIZON COMMUNICATIONS

In July 2002, Seidenberg gains sole control of the aggressive regional Bell operating company. Ever ambitious, he is concentrating on making Verizon a long-distance powerhouse by winning Federal Communications Commission approval to offer long-distance services in states where Verizon is the incumbent carrier. (See full profile, page 45.)

Tom Siebel
FOUNDER AND CEO, SIEBEL SYSTEMS

Siebel's drive has placed the company on top of the important customer relationship management software market, an area growing despite the anemic economy. Aggressive and arrogant, Siebel is a graduate of the Larry Ellison school of management. At Oracle from 1984 to 1990, he was among Oracle's top salespeople, useful experience for the CRM business. Siebel is now attempting to match his success in CRM with employee relationship management software.

Ben Waldman
VICE PRESIDENT, MOBILE DEVICES DIVISION, MICROSOFT

As wireless devices grow in complexity and usefulness, Microsoft has a new client to dominate. Success rests largely with Waldman, charged with crafting the Pocket PC strategy. He came to this post in January 2000 after a string of accomplishments for other Microsoft divisions, including at the Macintosh unit he created in 1996.

There he helped Office 98 become the platform's most popular office suite and Internet Explorer and Outlook Express to be bundled standard on the Mac. Waldman has declared that he will extend more desktop functionality to the Pocket PC, aim it at business users, and eliminate the need for a separate wireless Internet.

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POWER Users

Smell that, enterprise users? It's your buying power. Tech vendors whose heads were turned by young service providers and competitive local exchange carriers with long shopping lists are turning their attention back to enterprise users now that it's clear many of the fledgling service providers and CLECs can't pay their bills.

Mike Brady

FIRST VICE PRESIDENT OF GLOBAL NETWORKING SERVICES, MERRILL LYNCH

Brady works with a team of 106 and a budget of $300 million to provide global support for Merrill Lynch's voice, data and video networks; e-mail and Internet applications; nontransactional Web sites; and 21,000 of Merrill Lynch's 70,000 desktops. In 2001, the firm launched its new dense wavelength division multiplexing (DWDM) network connecting 10 sites in two states with high-speed Gigabit Ethernet and Fibre Channel connections. The DWDM network replaces telephone company-provided time-division multiplexer connections, and it enabled Merrill Lynch to eliminate its entire router backbone by tying the Gigabit links directly to its high-speed switched core. "We simplified the network, greatly increased capacity and decreased overall costs," Brady says.

When the terrorist attacks on the World Trade Center disabled the public network, Brady and team sped up completion of a back-up Gigabit laser system that was under consideration. Within a week, the free-space optics system was ready for business use. At the same time, the network group built out a new trading floor in just four days after the company's primary trading site was destroyed and its alternate site evacuated.

William Friel

SENIOR VICE PRESIDENT AND CIO, PRUDENTIAL FINANCIAL

Prudential continues to flex its e-commerce muscles under Friel, this year revamping and relaunching its Prudential Securities Web site and launching a Web-based business-to-business platform, PrudentialXpress. For its 25,000 telecommuting employees and business partners, the company created a massive VPN that halved Prudential's annual $14 million remote access bill — and earned it *Network World's* top User Excellence Award for 2001 (see www.nwfusion.com, DocFinder: 7335). Prudential also continues to grow its offshore software development company in Letterkenny, Ireland. Prudential opened Prumerica Systems Ireland in July 2000 to reduce its reliance on consultants and bring some of its outsourced IT work in-house.

Lieutenant General Michael Hayden

DIRECTOR, NATIONAL SECURITY AGENCY/ CENTRAL SECURITY SERVICE

Power security user Hayden and team need the latest gadgets and the most sophisticated, dependable technologies to keep up the country's information-gathering tactics — and to keep adversaries from getting at U.S. information systems. They are tasks made more difficult by the wide availability of encryption products and services, and the overwhelming amount of data the agency intercepts in its eavesdropping efforts. One new project reportedly in the works at the super-secret NSA is Trailblazer, a computer system designed for more effective processing and culling of useful intelligence from data collected.

Dennis Kirchoff

ANX DEVELOPMENT LEADER, FORD MOTOR

Dennis Kirchoff is a founding father of the ANX, the world's largest VPN-based e-commerce network. Ford, General Motors and Chrysler (now DaimlerChrysler) built the ANX with their trade association, the Automotive Industry Action Group, in 1996 to provide a secure, IP-based network for sharing supply chain data among channel partners in the automotive industry. In December 1999, AIAG sold ANX to Science Applications International. Today, 900 companies subscribe to the network service, which SAIC has expanded to include other industries such as financial services, healthcare and manufacturing.

Kirchoff continues to define Ford's role in the business extranet, and his counterparts at General Motors and DaimlerChrysler closely follow his work.

John Nallin

VICE PRESIDENT OF IS, UPS

The media loves to ask Nallin what two or three IT issues keep him up at night. It's not an easy question to answer when you're juggling 100 to 200 projects at any one time, Nallin says. "When you have a tech budget of $1 billion, you do a lot of stuff," he notes. Issues rising to the top lately have to do with business continuity, in light of the terrorist threat, and wireless and voice-recognition initiatives.

For Nallin, evaluating new IT projects is a balancing act: "You have to be aggressive about changing technologies. However, you also have to minimize risk and the impact of that risk."

Gary Reiner

SENIOR VICE PRESIDENT AND CIO, GENERAL ELECTRIC

Reiner has spent more than a decade with GE and continues to lead its IT and e-business efforts — which are at full-throttle despite the slowed economy. Even as other companies are tightening their IT budgets, GE reportedly plans to increase IT spending 12% in 2002. The company's e-business approach is three-pronged and covers internal processes, procurement and sales.

Internally, GE is trying to digitize everything possible, eliminating manual and paper-generating processes along the way. The company hopes to lop off $10 billion in its operational expenses in the coming years through these internal efforts.

On the buy and sell sides, GE worked to shift 30% of its purchasing online and to increase its online sales to 15% of total revenue in 2001.

Ralph Szygenda

CIO AND GROUP VICE PRESIDENT OF IS AND SERVICES, GENERAL MOTORS

Recruitment has been a key part of Szygenda's strategy since he joined GM as CIO in 1996 and was charged with reclaiming the IT projects the company had outsourced to Electronic Data Systems. He told one publication, "Technology is secondary to finding good people." Helped by the good people he's found, Szygenda has effected a cultural change at GM and earned the support of top management for his e-business initiatives, including launching Web sites for consumer and business customers and investing in procurement exchange Covisint Communications.

Most recently, GM absorbed its business-to-consumer Internet division, e-GM, back into the corporate organization. The company says it's not a withdrawal from e-business, but part of its original plan to pull the Internet division in-house once the corporate business was ready to handle it.

Lt. Gen. John "Jack" Woodward

DEPUTY CHIEF OF STAFF FOR COMMUNICATIONS AND INFORMATION AND DEPUTY CIO, U.S. AIR FORCE

Woodward's responsibilities include strategy, policies, architecture and standards for Air Force IT systems — a role that puts him atop a crew of 74,000. Under his watch, the Air Force is making military history with its My.AirForce portal, which will serve up data pulled from 28,000 legacy information systems and 1,500 Air Force Web sites and intranets. Woodward announced the project, now in its third phase of development, in August 2000. Within the next few months, 1.2 million users will have access to the MyAirForce portal.

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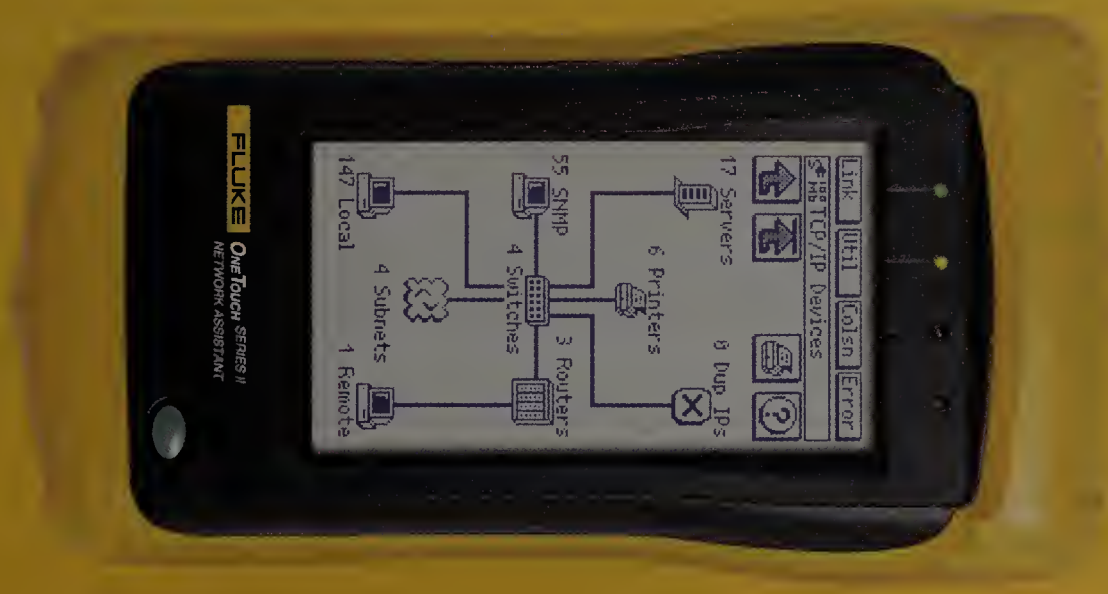

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Harald Alvestrand

CHAIR, INTERNET ENGINEERING TASK FORCE

A Cisco engineer and a longtime IETF participant, Alvestrand since March has headed the world's most powerful network standard-setting organization. He took over at a busy time, as interest in open, Internet-based protocols for emerging network applications is growing among corporate users. Internationalization is high on the group's agenda; one significant project is to create a way for the Internet's DNS to support languages other than English. A Norwegian, Alvestrand is the first non-American to hold the volunteer post.

Tim Berners-Lee

DIRECTOR, WORLD WIDE WEB CONSORTIUM

Berners-Lee continues to shape the Web he conceived. This year, W3C released the XML Schema specification, which defines how programmers should describe content using XML — in other words, an XML language for defining XML languages, he says. The XML Schema spec, more than two years in development, is expected to ease data exchange among businesses. Still among the projects on the W3C's agenda are XML encryption; digital rights management; and Resource Description Framework, for application interoperability on the Web.

Jeff Schiller

AREA DIRECTOR FOR SECURITY, IETF

Schiller's job is to make sure the standards that make their way through the IETF have adequate security features. If they don't, they'll get no further than him. Schiller says getting developers to pay attention to security is a recurring problem.

"People need to think about security upfront or they wind up making engineering decisions that make adding security difficult," he says.

Schiller isn't paid for the IETF job, and he didn't look for it. He was asked to volunteer in 1994, so he did, and he's been there ever since. Why? "I know how to do it, and it needs doing," he says.

Scott Valcourt

MANAGING DIRECTOR, UNIVERSITY OF NEW HAMPSHIRE INTEROPERABILITY LAB

Product interoperability is put to the test at UNH's Interoperability Lab. For the industry groups that fund the tests, it's a proving ground. For the students who staff the lab, it's an opportunity to work with real-world technology. For Valcourt, it's a bridge between his two passions, education and technology. "The mix is the perfect job," he says.

Valcourt predicts the technologies that will find their way into the interoperability lab next year include very-high bit rate DSL, Ethernet in the first mile, high-speed Fibre Channel and 802.11a wireless LANs.

POWER in Washington

They may be removed from the everyday tasks of *Network World* readers, but these big-picture policy players are making decisions that will shape the products and services available to enterprise users.

Colleen Kollar-Kotelly

JUDGE, U.S. DISTRICT COURT

Kollar-Kotelly is heading the remedy phase of the federal government's antitrust case against Microsoft. When a computerized lottery landed her that responsibility, media stories focused on her limited experience handling complex antitrust cases and her reputation for advocating out-of-court settlements. The spotlight could not have been much brighter. Today she's navigating the case down two paths — one for the Department of Justice and the nine states that have reached a proposed settlement agreement with Microsoft, and one for those that want to continue litigation. Critics charge that the proposed settlement is too lenient; Kollar-Kotelly, who pressed for the two sides to negotiate, must approve the settlement. She hasn't indicated how she will rule.

Michael Powell

CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

As one of the nation's top regulators, Powell will set the direction of U.S. communications policy, including spectrum use and the regional Bell operating companies' entries into long-distance, through the Bush administration. Powell is said to favor a more hands-off, deregulatory approach than some of his predecessors. He wants the FCC to move quickly and recommends that Congress increase penalties for anticompetitive practices. He wants fines on incumbent local exchange carriers that violate competition terms of the Telecommunications Act to increase from $1.2 million to at least $10 million per violation.

Powell has said he will push for a more technologically literate FCC; education for regulators, judges and lawyers is one of his priorities.

Tom Ridge

DIRECTOR, OFFICE OF HOMELAND SECURITY

His post is by no means the only one dedicated to domestic security, but it's one of the newest. Former Pennsylvania Gov. Ridge took the helm of the nascent U.S. Office of Homeland Security in October, charged with shoring up domestic security and streamlining information-sharing among the dozens of government agencies coordinating antiterrorism efforts. At his swearing-in, Ridge summed up the challenge: "Americans should find comfort in knowing that millions of their fellow citizens are working every day to ensure our security at every level — federal, state, county, municipal.... But there may be gaps in the system. The job of the Office of Homeland Security will be to identify those gaps and work to close them. The size and scope of this challenge are immense."

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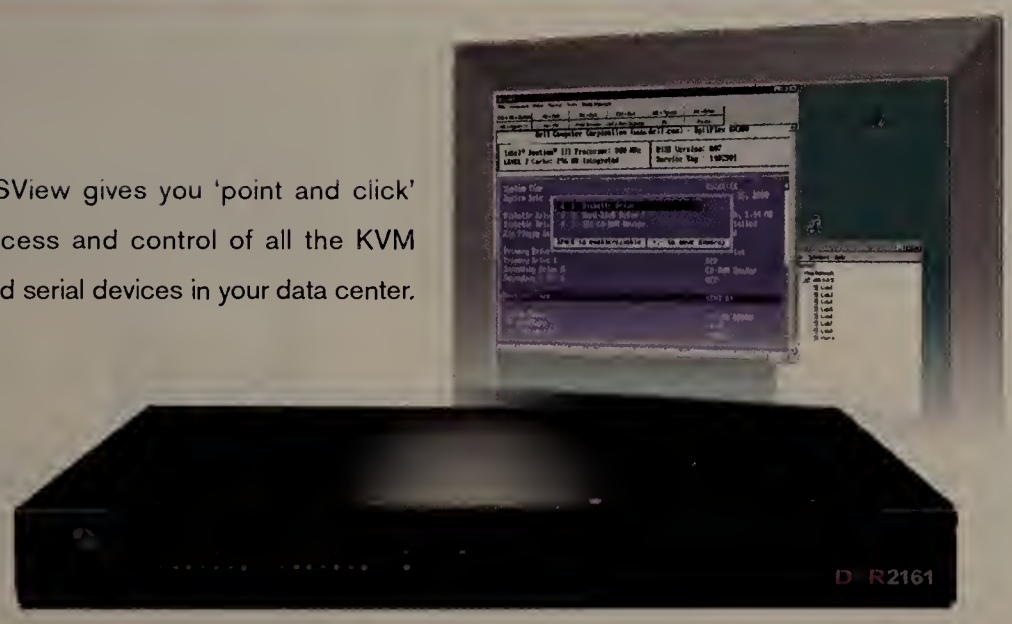

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POWER Thinkers

Venture capitalists and analysts have the power to influence an industry through their actions and observations. They help shape vendors' product development plans, and they guide enterprise buying. If only they could answer with absolute certainty — and unanimity — the question on everybody's mind: When is the economy going to bounce back?

Frank Dzubeck

PRESIDENT AND CEO, COMMUNICATIONS NETWORK ARCHITECTS

Dzubeck is quoted often on the state of the network industry, and his comments reveal a no-nonsense, straight-talking kind of guy. This year, he's laced the pages of *Network World* with commentary on Lucent bottoming out, Nortel breaking up and ultrawideband wireless taking off — among many other topics. His candor is his power.

Paul Ferri

MANAGING PARTNER, MATRIX PARTNERS

A venture capitalist for more than 30 years, Ferri founded Matrix Partners in 1982 and made it one of the most profitable venture capital firms in the 1990s. His string of successes includes ArrowPoint Communications, Equipe Communications, Sonus Networks, Sycamore Networks and Xyplex. The company continues to invest, though at a slower pace than in previous years, Ferri says. Matrix Partners backed four new companies in 2001, each of which received typical first-round funding of $5 million to $7 million, Ferri says. One area where he sees traction is wireless infrastructure; Ferri sits on the boards of two wireless start-ups, including Winphoria Networks.

Christine Heckart

PRESIDENT, TELECHOICE

Telecom equipment vendors and service providers look to Heckart for help in bringing new products and enterprise services to market. It's a challenge made more difficult by the fact that market momentum is no longer on their side. Not only is the market getting smaller, but the pace of innovation among companies in the public network sector — the service providers — is slowing, she says. One bright spot Heckart sees in the telephone company sector is that the fiber glut many people say exists isn't a reality. TeleChoice last summer completed a route-by-route study of network capacity and found that only four of the 22 largest long-haul routes in the U.S. are overbuilt — which is good news for infrastructure vendors.

Tim Kane

PRESIDENT, INTERNATIONAL TELEWORK ASSOCIATION & COUNCIL

When Kane began his two-year presidential term at ITAC on Nov. 1, enterprise interest in telework programs seemed at an all-time high in the wake of the Sept. 11 terrorist attacks. For the next few months, companies will be in scramble mode, focused on fundamental telework issues such as connectivity and security, Kane says. After that, they'll focus on long-term strategies for supporting a distributed work environment — and Kane is eager to help. Though a niche association, ITAC is in a position to influence widespread enterprise teleworking initiatives, with resources addressing business and technology aspects.

Thomas Nolle

PRESIDENT, CIMI CORP.

Clients turn to Nolle for thoughtful, honest advice. A self-proclaimed industry realist, Nolle says he feels an obligation to be accurate as an analyst, not entertaining. He predicts the market for IT products and services in 2002 won't shrink further, as some are suggesting, but will instead grow slightly over this year's figures. But don't expect a turnaround overnight. In the IT industry, "nothing important can happen quickly, unless it's bad," he says. Instead of extravagant, investments will be "pedestrian and [return-on-investment]-driven," he says.

Dave Passmore

RESEARCH DIRECTOR, THE BURTON GROUP

What's the hot technology these days? There isn't one, according to Passmore. Other years he could point to optical networking or wireless LANs, he says, but today "there is no more hot area." Passmore leads network infrastructure research at The Burton Group and continues to shape NetReference Architecture, a planning model for networks that he helped develop and The Burton Group acquired two years ago when it bought the company Passmore founded.

Winn Schwartau

PRESIDENT, INTERPACT

Schwartau teaches security awareness to commercial and government clients. Just about every government agency in the U.S. and several foreign government organizations have used his services. One tendency he sees across clients is that people view network security exclusively as a technology issue. But Schwartau advocates a "new security triad," which is a synthesis of three security components: cyber, physical and people. It's not a new concept for Schwartau, but more people are listening to his advice following the terrorist attacks. "Bittersweet" is how Schwartau describes the recognition that his theories about an Electronic Pearl Harbor — a term he coined — are not just scare-mongering.

Linus Torvalds

LINUX DEVELOPER

Torvalds started 2001 with the release of the long-awaited Linux 2.4.0 kernel — a debut that is helping the open source

operating system make significant headway in corporations. Developers and users were eager for the new code, which offers increased symmetrical multiprocessing scalability and other features to make it easier for users to run corporate applications on Linux-based servers. IBM and Hewlett-Packard are working on carrier-grade servers suitable for telephone companies and large enterprise deployment.

John Walecka

FOUNDING PARTNER, REDPOINT VENTURES

While other venture capitalists may be lying low, Walecka isn't. He says the best time to invest in new companies is during a recession, and Redpoint has backed 12 new companies in 2001. "People are more patient, and there's time to get things done [during a recession]," says the venture capitalist who backed infrastructure companies such as Agile Networks, Optimight and Xylan. Market focus these days is on selling to enterprise and traditional carrier customers, he says, as the competitive local exchange carrier market has essentially vaporized. Walecka sees opportunity in wireless data technology and says there's room for innovation in the enterprise storage market, which is going through "major discontinuity."

Phil Zimmermann

CRYPTOGRAPHIC CONSULTANT

The inventor of Pretty Good Privacy, Zimmermann remains unwavering in his beliefs that privacy is paramount. After the Sept. 11 terrorist attacks, Zimmermann released a statement reiterating his belief in the importance of cryptography for protecting privacy and civil liberties: "Did I reexamine my principles in the wake of this tragedy? Of course I did. But the outcome of this reexamination was the same as it was during the years of public debate, that strong cryptography does more good for a democratic society than harm, even if it can be used by terrorists. Read my lips: 'I have no regrets about developing PGP.'" ■

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AT&T's next-in-command?

AT&T President David Dorman is ready for the challenges presented by the company's dismantling.

BY DENISE PAPPALARDO

Just one year ago, David Dorman became AT&T president, a position most telecommunications veterans would jump at given the chance. And now it seems he's poised for even more power.

C. Michael Armstrong has indicated he'd likely retire as CEO in 2002 to become chairman at AT&T Comcast, once that expected merger closes. Most industry watchers consider Dorman next in line for the AT&T CEO job.

But Dorman doesn't pay attention to the whisperings. "With any No. 2 guy at a company, people speculate about his future. Mike's 63, he's my boss. If I do a good job, I get considered. I'm so darn busy with what I've got here, it would be egocentric to think about it," Dorman says modestly.

Still, it's hard to imagine him turning down the position if extended to him. Here's what he has to say about being offered the president slot: "If you grew up in this industry, the opportunity to become president of AT&T is a powerful inducement. It was one of those jobs that was very appealing to me right from the start."

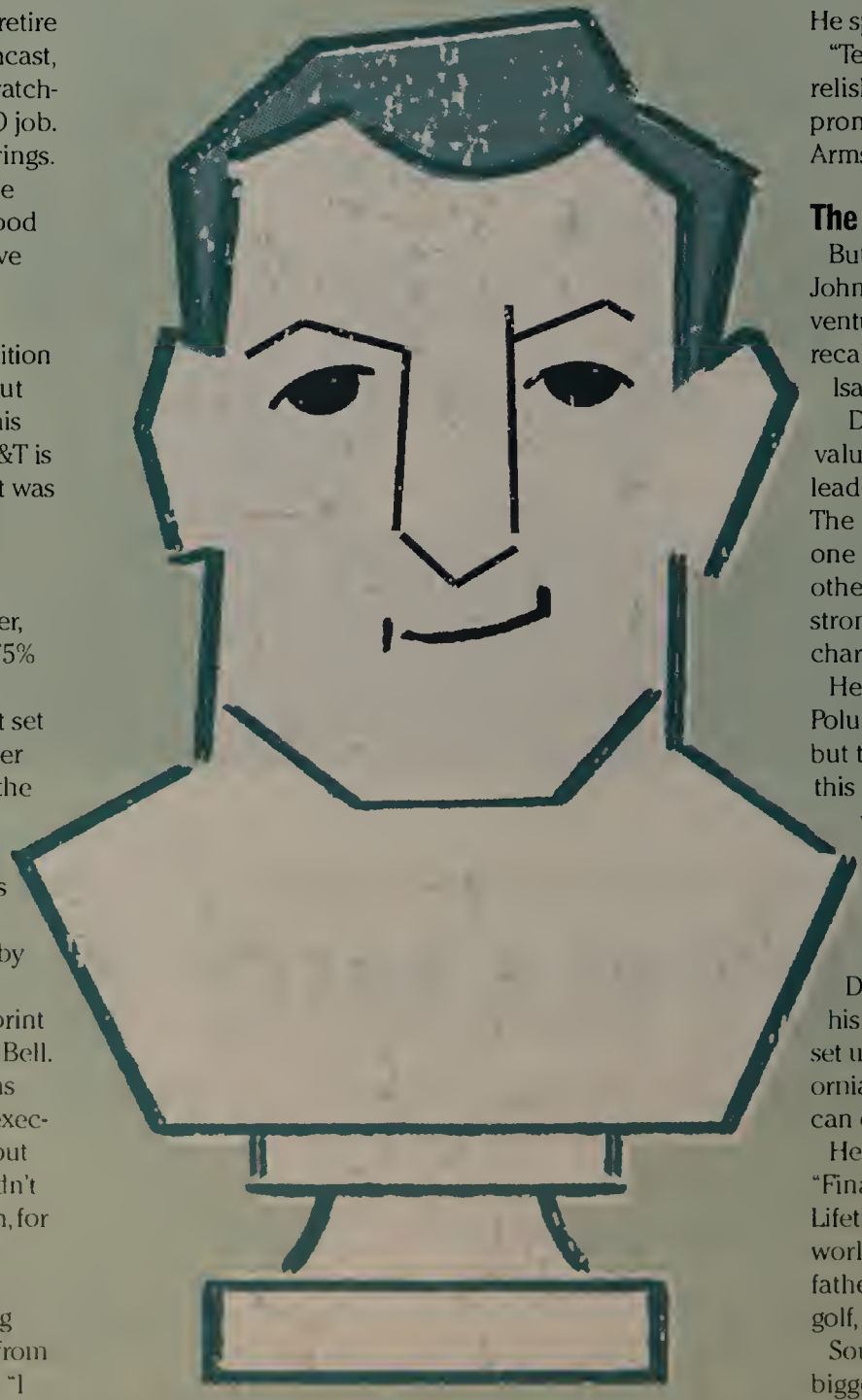
20 years in the making

As president, Dorman oversees business, consumer, lab and network operations. He's accountable for 75% of the $66 billion in revenue and 163,000 workers.

If Dorman is the next CEO, he'll look at a different set of assets than Armstrong does today. Since October 2000, AT&T has been restructuring by spinning off the wireless, consumer and broadband divisions. The next CEO will likely see the restructuring plans through and operate AT&T Business, the company's vast broadband networks and AT&T Labs.

Dorman says he's up for the challenge, prepared by 20 years in telecommunications. Dorman spent 13 years at Sprint, ultimately becoming president of Sprint Business. In 1994, he left to become CEO at Pacific Bell. He stayed there through the SBC Communications acquisition in November 1997. He then served as executive vice president under CEO Edward Whitacre, but only for four months. He left because his family didn't want to leave California, heady with the tech boom, for SBC's Texas home. "It would have been like leaving Florence during the Renaissance," Dorman quips.

Instead, he took part in that Renaissance by joining PointCast, of "push" technology fame. His departure from the world of telecom lasted just one frustrating year. "I couldn't use everything I knew. It was hard for me to work hard [at PointCast]," Dorman says. "I went from managing 50,000 employees to 225."



It took little convincing to sign him on as CEO at Concert Communications, the international joint venture that AT&T and British Telecom are in the process of closing. He spent a year there before Armstrong came calling.

"Telecom is in my blood," says Dorman, noting that he relishes the experiences garnered working for three prominent telecom CEOs — William Esrey of Sprint, Armstrong and Whitacre.

The house that Dave built

But Dorman is his own man, with his own style, says John Polumbo, senior vice president of international ventures and enterprise marketing at AT&T. Polumbo recalls when Dorman hired him nearly 20 years ago at Isacom, which eventually became part of Sprint.

Dorman carried around a copy of his management values, which Polumbo calls "Dave's house." It's a list of leadership principles written in a diagram of a house. The roof of this house says "Focus on customer" on one side and "Games/politics unwelcome" on the other. The body of the house includes four planks: strong intellectual skills, work ethic, teamwork and character/integrity.

He still carries this management guide around, Polumbo says. "Dave would say, 'This is not my house, but the house of all great leaders.' But he lives his life this way, manages this way, lives with his family this way. He has no patience for people who use situational ethics," says Polumbo, adding that Dorman says what he means and expects others to do the same.

Outside passions are wine and golf, after family, Dorman says. And he's a gadget guy. He does 75% of his e-mail on his wireless BlackBerry device, and he's set up 11M bit/sec wireless LANs at his homes in California and Atlanta so he, his three children and his wife can connect to the Internet simultaneously.

He also likes to read in his spare time. He just finished "Final Rounds: A Father, a Son, the Golf Journey of a Lifetime," a book about a father and son who travel the world to play the most famous golf courses after the father learns he's dying. "I almost always read about golf, business or adventure," he says.

Sounds about right for a guy poised to embark on the biggest business adventure of his life. ■

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Cisco's development hope

Cisco's ability to shift successfully into technology development depends on how well Mario Mazzola, chief development officer, does his job.

BY JEFF CARUSO

It was May 2000, and Mario Mazzola was counting the days to his retirement. His co-workers had thrown a retirement party for him. Cisco had issued a press release three months earlier, stating he would be "sorely missed" as senior vice president of the network giant's enterprise line of business.

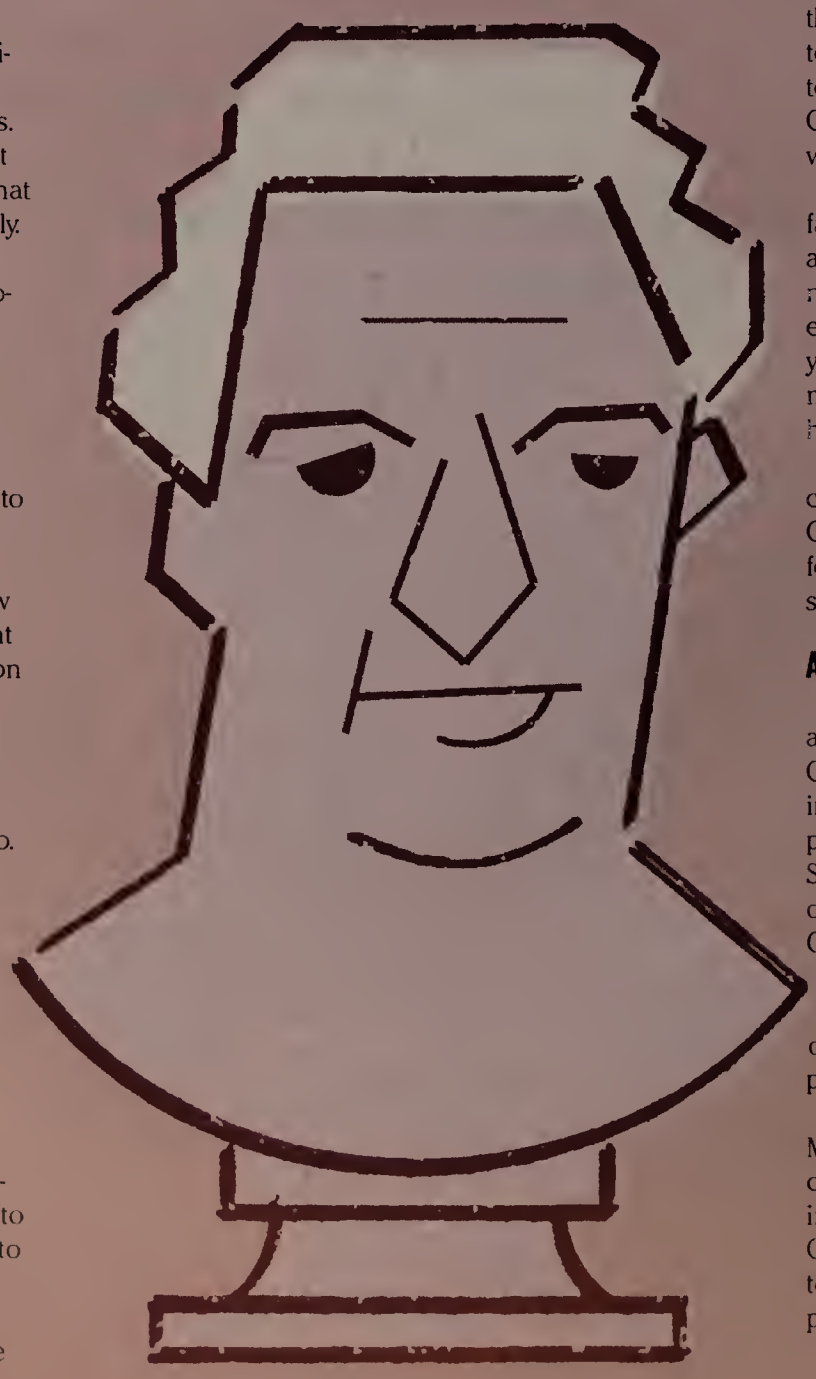
Mazzola had been instrumental in building that business to the point where Cisco fully dominated the enterprise market, with a large base of loyal customers. All it had to do was continue milking the cash cow. At 54, Mazzola figured he could go out on top, and do what so many dream about: spend more time with his family.

Then he brought the youngest of his three children, Francesca, to the office as part of a bring-your-child-to-work day, and she observed that her father was well-liked and well-respected at Cisco. "Everybody knows you," she said to him. "Why do you want to leave?"

Mazzola didn't have a good answer. He already had doubts about retiring, as he realized that engineering was in his blood. If not working with other engineers to build something useful and valuable — well, what exactly would he do with his time?

So he stayed, serving as senior vice president of new business ventures until he became chief development officer earlier this year following Cisco's reorganization into 11 major technology groups. In this capacity, he coordinates development efforts across all groups.

It's a new kind of role for Mazzola, where he has to find synergies across a broad product line and direct the massive development resources available to Cisco. In the past, he had been comfortable leading smaller teams working in smaller markets. "It's easier to build something from scratch, rather than work with existing business situations," he says. But given his experience, co-workers agree he's the right man for the job.



From Sicily to the Silicon Valley

Born in the Calabria region of Italy and raised in Sicily, Mazzola's first engineering job was at Olivetti in the 1970s, helping to design CPUs and storage subsystems. Partnerships with Intel and others brought him to Silicon Valley, where he and some peers got the idea to combine voice and data on the same infrastructure. With backing from Olivetti and venture capital firms, Mazzola co-founded David Systems in 1982 to pursue that goal — one that companies are still working toward today. "It was a little bit premature," he admits.

He left in 1990 to start and head Crescendo Communications, a LAN switching company that developed an encoding scheme later used as the base for Fast Ethernet and for transmitting FDDI over copper.

Crescendo attracted the attention of Cisco, which in 1993 was looking to expand beyond its router heritage into the fast-growing area of LAN switching. Cisco told the company it saw LAN switching as a potential core technology — and the two companies could work together or compete. The $93 million purchase of Crescendo was the first of many acquisitions Cisco would make over the next eight years.

For Mazzola, accepting the offer was a bit of a leap of faith. He received assurances that his team would have a good deal of latitude to build the LAN switch business within Cisco. He insisted that Crescendo's 62 employees keep their jobs at Cisco for at least two years. Mazzola's commitment to his employees is a hallmark of his character, and co-workers say they regard him as a friend as well as a manager.

But ultimately, it was still difficult to give up his baby, recalls longtime co-worker Jayshree Ullal, vice president of Cisco's optical network group. "There was an emotional feeling of loss, even though logically we knew it made sense for both Crescendo and Cisco," she says.

A Catalyst for LAN switching

Guided by thorough market research and a pragmatic approach to technology, Mazzola helped build the Catalyst family of switches into a powerhouse. He did so in part by championing the acquisitions of other companies, including Kalpana, Grand Junction and Granite Systems. Without falling in love with a technology for its own sake, Mazzola can spot opportunities, says Charles Giancarlo, senior vice president and general manager of technology development at Cisco. For example, Mazzola saw that the Catalyst 6500 could be used not only for enterprise backbones, but also for service providers, data centers and wiring closets.

This pragmatism will serve him well in his new role. Mazzola now has the power to change, duplicate or cross-purpose development efforts and to fill the gaps in integration across product lines that resulted from Cisco's acquisition-heavy strategy. "Developing new technologies, products and solutions has always been a passion for me," he says.

Just don't tell him it's time to retire. ■

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IBM's CEO-in-waiting

After 28 years at Big Blue, Sam Palmisano, president, is poised to take over the top spot — and lead the company to the $100 billion mark.

BY KATHLEEN OHLSON

Relaxed. Goal-oriented. Gregarious. Straight-shooter.

These are some of the characteristics Sam Palmisano, IBM president, will bring to the top spot when he takes it over next spring when Lou Gerstner retires. That Gerstner will leave and Palmisano will become Big Blue's next CEO are almost certainties.

Scuttlebutt surrounding IBM's leadership is that Gerstner will retire when his contract expires in March. At 60, Gerstner is at the age when all senior IBM executives have retired over the past 30 years. Palmisano, 50, has been Gerstner's right-hand man since Day One, and long considered his heir apparent.

The CEO prep work predates Gerstner's arrival, with Palmisano serving at one point as executive assistant to former CEO John Akers. But when seeking Akers' replacement in 1993, with IBM in financial straits, the company turned to outsider Gerstner, who had much-needed business experience at RJR Nabisco and American Express. Palmisano, on the other hand, had spent the previous two decades at IBM.

True Blue to the heart

Palmisano joined IBM at age 22 fresh from John Hopkins University. He first worked in its data processing group, then later as IBM Japan's senior managing director of operations — one of a few IBM executives to spend time overseas. Palmisano also ran the PC division, and the server and storage group. Now as president and COO, Palmisano is responsible for IBM's operating units, including all products and services divisions, as well as sales, distribution and global financial businesses.

His biggest accomplishment is making IBM Global Services the powerhouse it is today.

Palmisano was running IBM's outsourcing subsidiary, Integrated Systems Solutions, which was making a modest profit, when he inherited its money-losing consulting and systems integration business in 1995. His analytical and aggressive business persona turned the division around from losing tens of millions of dollars to making a profit by year-end. The divisions were later combined into Global Services, which handles everything from running a business' IT department to consulting on system and software upgrades.

Global Services raked in $8.6 billion in revenue in the third quarter of 2001, accounting for almost half of IBM's $20.4 billion quarterly revenue. Business is booming so much that the unit has a backlog of total services contracts worth approximately $97 billion.

"He's a great closer. He knows how to do business — what's good against what's bad. He's walked away from accounts, and those who got the account were sorry years later," says Frank Dzubeck, president of Communications Network Architects and a *Network World* columnist.

Dzubeck recounts when IBM and Electronic Data Systems (EDS) were bidding to get an outsourcing contract from Xerox in 1994. Palmisano sensed the deal wouldn't benefit IBM, so he deliberately bid high. EDS won the 10-year, $3.2 billion contract, but sued Xerox in 1999 claiming Xerox's failure to pay for certain infrastructure charges caused EDS to write off $200 million. Xerox and EDS later renegotiated the contract.

Ready for the limelight

As a manager, Palmisano wants results and likes to get to the point.

"He's similar to Gerstner in that they don't believe management should be foilware — wonderful presentations and slides," says Bob Simko, an analyst at the International Technology Group.

But with his technology background and relaxed personality, Palmisano is expected to be a much more visible industry leader than Gerstner has been.

"He's much more easygoing than Lou Gerstner," Dzubeck says. "He likes audiences, whether they are his peers or underlings. He likes the atmosphere of give and take. When he enters a room, it doesn't get quiet, whereas when Lou Gerstner enters a room you know he's there to make a speech."

Palmisano will continue Gerstner's strategy of shifting IBM's focus from hardware to software and services. And he's already groomed and named his people to key positions: Steve Mills to oversee IBM's software group; Linda Sanford to its storage systems group; and Bill Zeitler to its server group.

His biggest challenge is one every company faces: the economic recession. But the pressure will be greater for Palmisano, as he's expected to move the company's sales to the $100 billion mark — Big Blue tallied $88.4 billion in 2000 and is expected to report 2001 sales in the same range. ■

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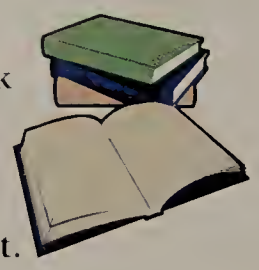

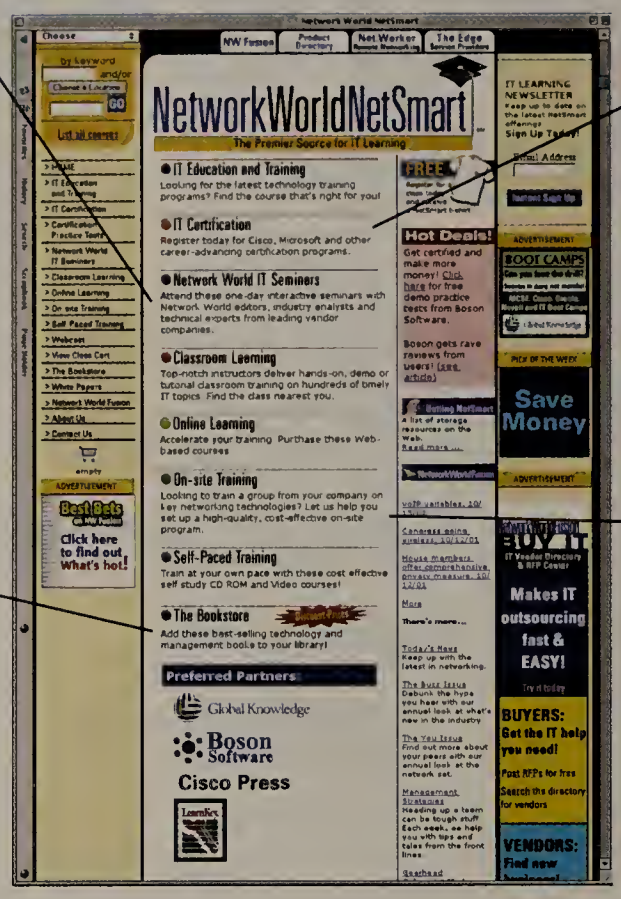

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Microsoft's .Net apostle

BY JOHN FONTANA

Eric Rudder, senior VP of developer and platform evangelism, must convert developers to .Net or Microsoft can kiss its Web services future goodbye.

Eric Rudder draws comparisons to Bill Gates, and it's no wonder: He spent from 1997 to 2001 as Gates' technical advisor, two years longer than anyone has ever survived in the post. And Rudder, 34, is a geek at heart and a developer to the core. "Creating great software is what I get up and think about in the morning," Rudder says. "I love that you can think of something in your head and then make it 'come alive' in a program."

He'll need that enthusiasm in the job of senior vice president of developer and platform evangelism, which he began in October. Rudder heads the first and arguably most crucial step in Microsoft's .Net program, its current act in a long-running play of technology shifts. He must educate, convert and nurture more than 6 million developers on .Net, the bet-the-company strategy to deliver software as a set of services over the Internet that Rudder spent those four years helping Gates devise. Converting developers has been the foundation of every Microsoft success. Now Rudder is a front-line general for the first major .Net product release — Visual Studio.Net. D-day is set for Feb. 13.

A developer's best friend

Few people at Microsoft would bet against Rudder.

"Eric understands developers deeply," says Dave Mendlen, lead product manager of Visual Studio.Net. "He was a key guy in building FoxPro and, more important, in creating an incredibly rabid community of [FoxPro] developers. To this day we don't have another customer base that is as passionate about their tool as the community that Eric fostered."

Rudder, one of 27 executives on Gates' Business Leadership Team, says he aims to engender that same passion among .Net developers, especially users of Visual Studio.Net, a product he helped create and regards as one of his major accomplishments. "One of the keys with FoxPro was communication with the developers. We really knew our customers," he says.

Being a good listener, Rudder says, also will define his management style — as will a few tricks. Rudder once bet a product team it couldn't get down to less than 20 bugs before he could drop 20 pounds. He lost the bet but also the weight. "Having the discipline to believe in something and having the discipline to invest in something until it pays off is definitely a lesson that I've learned from working with Bill," Rudder says.

A second Gates

While the unassuming Rudder would never compare himself to Gates, others do. Respect for Rudder's ability runs so deep that many people who now report to him lobbied for him to get the job.

"He is like Bill in a lot of ways. He has a passion for technology and the industry," says Marie Huwe, product manager for the .Net framework and Visual Studio.Net.

Like Gates, Rudder is known for his depth and breadth of knowledge, not only about Microsoft's products and strategies but also those of competitors. He's quick to determine the root of problems and is methodical in making sure everything is done right.

He also can be intimidating like Gates, shredding managers unprepared to defend their product developments during so-called "Bill reviews," a sort of tribunal before Gates. But far from grandstanding, Rudder views that process as creating challenges for others to exceed the possibilities to which he devotes so much thought.

It's another thing he learned from Gates. "One of the things I most admire about Bill is his ability to think about hard problems," Rudder says.

Rudder has solved many hard problems at Microsoft since arriving in 1988 as a magna cum laude graduate of Brown University with a bachelor's degree in computer science. Although he began writing his first Windows program by copying it out of a book, the transplanted New Yorker with a love for his hometown's amazing Mets was soon doing astounding things of his own. He started out running product teams, working on networking, Windows for Workgroups, FoxPro, Visual Basic and Visual Basic Script. He became the point man, devising strategies and directions for new products, then moving on to the next frontier. Eventually, he became general manager for Visual Studio before Gates summonsed him.

About the only thing not amazing is his self-described "bricklayer" status on the basketball court, where he's often found working off stress. He may perfect his jump shot yet; no doubt he'll be spending lots of time on the court as he faces the demanding task of making sure developers are an ace in the .Net strategy. ■

The POWER Issue

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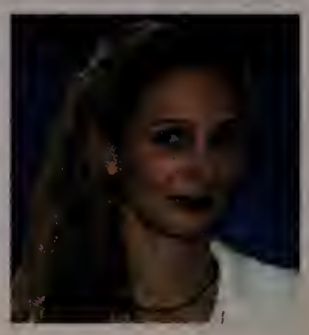

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My Chung was appointed to the Board in May 2001, having joined Spirent in July 1998 as Group President, Communications, a position he still holds. Previously, Mr Chung was Division President of Telecommunications Techniques Corporation ('TTC'). Having joined TTC in 1987 as National Sales Manager, he later became Director of Sales and Vice President of US Sales. In 1992, he became Division President with responsibility for the Network Services Division, focusing on products used in the installation and maintenance of networks at customer premises. His responsibilities included product development, marketing, manufacturing and accounting. He was involved in setting TTC's strategic direction through a number of strategic partnerships and acquisitions.

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Verizon's master builder

In July 2002, Verizon Co-CEO Ivan Seidenberg gains sole control of the aggressive RBOC and its grand long-distance plans.

BY MICHAEL MARTIN

One of the keys to surviving in the depressed telecommunications market is to build mass. More customers equal more services revenue, which is crucial when the capital market barons are keeping a tight eye on their wallets.

Few telecom executives know more about building mass than Ivan Seidenberg, co-CEO of Verizon — and merger master extraordinaire.

Seidenberg, 54, began his telecom career more than 30 years ago, toiling as a cable splicer's attendant at New York Telephone so he could attend school at night. His dedication has never faded: Seidenberg has stayed with the company his entire career. Granted, the company has changed in ways that Seidenberg could never have imagined as a young outside plant engineer.

In 1996, as CEO of Nynex, the regional Bell operating company serving New York, Seidenberg forged a merger with fellow Baby Bell, Bell Atlantic, to create a telecom giant that would dominate the local voice services market in the northeastern U.S. Two years later, as Bell Atlantic CEO, Seidenberg drove a merger with local and long-distance provider GTE.

In 1999, Seidenberg led efforts to combine the wireless voice businesses of Bell Atlantic, GTE and Vodafone AirTouch into Verizon Wireless.

Now, the ambitious Seidenberg is concentrating on making Verizon a long-distance powerhouse by winning Federal Communications Commission approval to offer long-distance services in states where Verizon is the incumbent local carrier.

Building consensus, delegating authority

Seidenberg didn't get to where he is through bluster and bravado. "He's a consensus builder," says Blake Bath, a senior telecom analyst with Lehman Brothers. "All of the mergers of different companies and different cultures requires power sharing and consensus."

Nothing illustrates this point better than Seidenberg's power-sharing arrangement with former GTE CEO Charles Lee. Co-CEOs often have trouble working together, but no rifts have appeared at Verizon.

In addition to being a consensus builder, Seidenberg is a delegator. He readily hands off responsibilities to his subordinates. "He expects his senior team to run their business units as if they were CEOs," says Peter Thonis, executive vice president for external communications at Verizon.

Again, Seidenberg's style fits the situation. Some of Verizon's business units are billion-dollar operations and one executive couldn't possibly micromanage the entire company.

But Seidenberg can be hands-on in demanding situations, such as when Verizon is dealing with the federal government on telecom regulation. He frequents Washington, D.C., power spots to deal with senators, congressmen and the FCC, Thonis says. He's got "low-key charisma," Thonis describes.

Ever the advocate

Federal regulation and competition are two issues close to Seidenberg's heart. And he's not one to miss an opportunity to hammer home his points on them. Soon after the Sept. 11 terrorist strikes, Seidenberg outlined what he thought telecom executives and regulators should focus on in the wake of the attacks. His main argument was one you'd expect from a man who is leading an RBOC's charge into long-distance and a company determined to spread its influence.

True competition, he argued, should require service providers to invest in network technology so they can increase the number of diverse facilities. Forcing incumbent carriers to resell elements of their own networks to competitors discourages new investment. What's more, he said, large, national carriers are best-suited to respond to disasters such as the attacks because they have the resources and capital for quick and effective reaction.

In Seidenberg's mind, telecom policy should create more incentives for competitive providers to build out their networks and for all providers to roll out more broadband services to consumers and businesses.

With many competitive carriers reeling in the economic downturn and Verizon steadily ramping up its long-distance efforts, it might appear that Seidenberg doesn't have many challenges left. But Seidenberg does need to heighten Verizon's data efforts, particularly on DSL and wireless, Lehman's Bath says.

And he needs to find ways to generate more cash to compensate for the company's highly leveraged balance sheet, Bath says. If not, Verizon might find it hard to make any acquisitions.

Of course, with Seidenberg's track record and ambition, it would be foolish to bet against him. In 1994, back in the Nynex days, Seidenberg said he would rather have 10% of the world telecom market than 100% of the northeastern U.S. market.

It would appear that he's well on his way.

CEO Powerometer Tussle for the top

BY JULIE BORT

After one of the roughest years ever, Cisco CEO John Chambers gets the vote as the most powerful vendor executive in the industry from the 250 readers who participated in our annual 2001 Powerometer survey, but only by a thread. Microsoft's CEO lagged Chambers by a mere 1/2 point.

More telling, Steve Ballmer's score increased over last year's by five points, to 72.5, while Chambers' rank dropped five points to 73. And 30% of respondents believe that Chambers' power will remain the same in the coming year while only 26% see it increasing. Likewise, 34% see Ballmer's influence at a standstill for 2002 while 27% believe it will grow.

But even if the balance of power between these two remains the same, Chambers will probably never again nearly single-handedly control the network industry. Participants view Dell CEO Michael Dell and Oracle CEO Larry Ellison as more likely than Chambers to increase their influence in 2002. Thirty percent of respondents say Dell will grab power in 2002, perhaps because he seems determined to attack networking, via storage products and low-cost switches, in the same fashion as PCs. Twenty-nine percent believe Ellison's influence will rise in 2002. This even though e-commerce and application service providers are not the boom markets Oracle banked on. Still, respondents are paying homage to Ellison's uncanny ability to grab the spotlight — most recently by squawking that the U.S. should create a national standard for identification cards, via Oracle software of course. Interestingly, neither Dell nor Ellison nudged up this year from their 2000 Powerometer slots of 5 and 6.

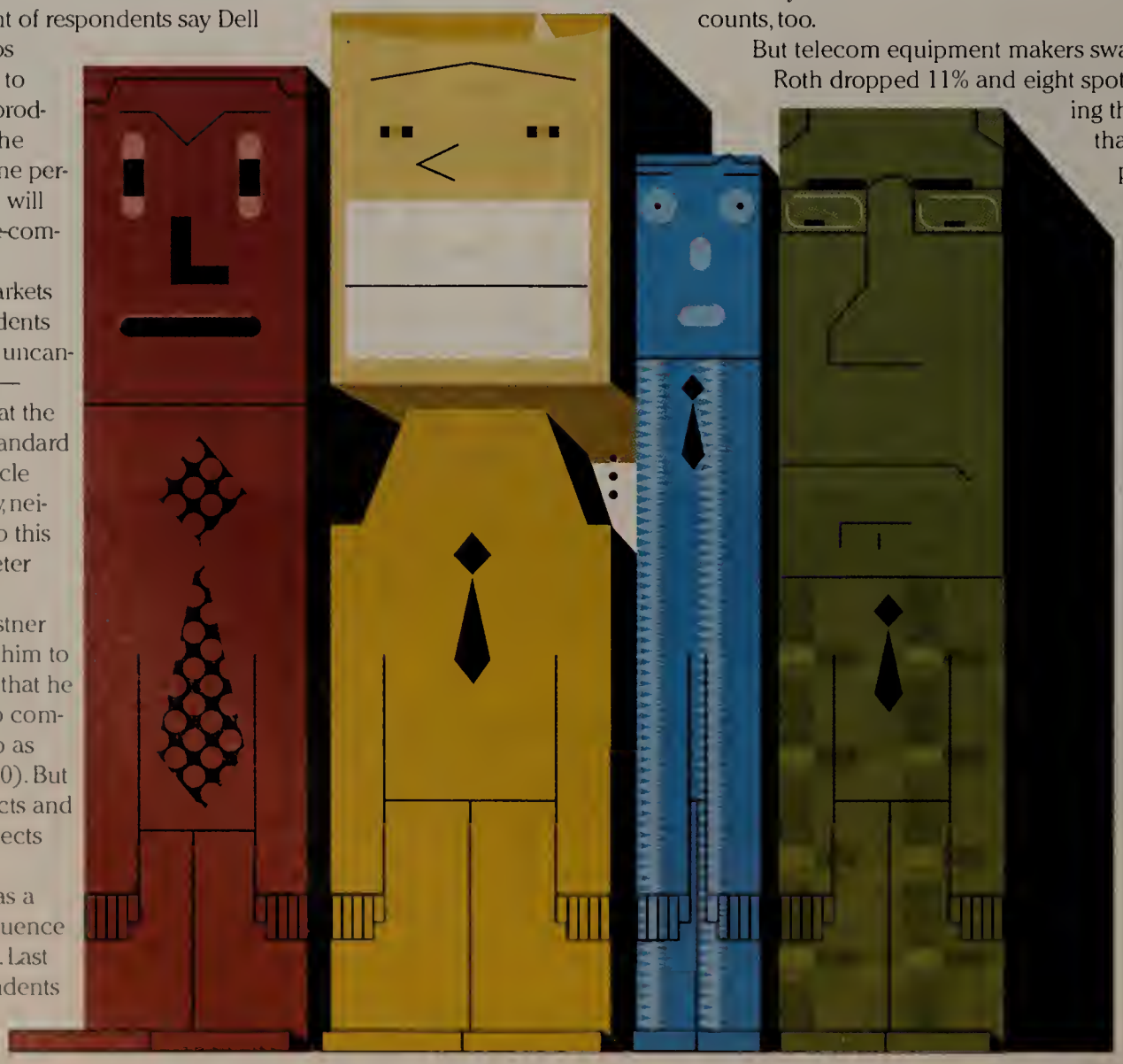
Not so for IBM CEO Lou Gerstner — his score rose 9%, boosting him to the No. 4 spot, despite the fact that he may hand the CEO slot over to company president Sam Palmisano as early as 2002 (see story, page 40). But readers laud IBM's Web products and support for Linux, and that reflects well on Gerstner.

The surprise of the survey was a whopping 38% increase in influence by Alcatel CEO Serge Tchuruk. Last year, his first on this list, respondents replied, "Who?" and granted him a 38.7 Power Rating, one of the lowest scores in the survey's six-year history. In 2001, his 53.2 score tied him at 22 with BellSouth CEO Duane Ackerman. This is good news for Ackerman, too. A 53.2 is a 15%, and one rank, raise over last year, largely on his highly visible attempts to glean entry into long-distance.

Heads of other incumbent local exchange carriers fared even better. Verizon CEO Ivan Seidenberg's rank jumped 14% and six spots to No. 11; Qwest Communications CEO Joe Nacchio's increased 15% and six spots to No. 12. However hard hit the telecom industry is, user need for bandwidth has yet to subside — and charisma counts, too.

But telecom equipment makers swan-dived. Former Nortel CEO John Roth dropped 11% and eight spots. He was still in the corner office during this survey, but had announced in April that he would retire, retaining a board position through 2002. And his 2001 performance was abysmal. Under his leadership, Nortel's share in the crucial optical equipment sector dropped from 47% to 17% between the fourth quarter of 2000 and the second quarter of 2001, the Dell'Oro Group says. That, in part, attributed to massive employee layoffs and business unit sell-offs that slashed Nortel's 95,000-strong workforce by about half.

In more stories of succession, Lucent CEO Henry Schacht landed last, with a score of 46.7, compared with the 11th spot his predecessor, Richard McGinn, held in 2000. (Granted, McGinn earned that rank weeks before his hasty departure in wake of the company's tumbling fortunes.) Respondents have taken a wait-and-see attitude on Novell's new CEO, Jack Messman, allotting him the rank of 24 on a score of 50.2. They hold more hope for EMC CEO Joe Tucci, who made his Powerometer premier at the creditable half-way mark, No. 13. ■



JOHN HERSEY

2001: Chambers retains his No. 1 title in our annual reader survey on most powerful vendor CEOs, but Ballmer closes the gap.

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THE MOST POWERFUL CEOs

The 2001 trifecta of Chambers, Ballmer and Barrett take first, show and place in this year's Powerometer survey of 250 readers, as it did last year. But Chambers lost ground while Ballmer gained and Barrett held steady. Survey respondents ranked the CEOs on a scale of 1 to 100, with 100 being the most powerful.

2001 Rank	CEO	Company	2001 Power Rating	2000 Power Rating	Change	2000 Rank
1	John Chambers	Cisco	73.0	76.7	-5%	1
2	Steve Ballmer	Microsoft	72.5	69.1	5%	2
3	Craig Barrett	Intel	69.2	68.3	1%	3
4	Louis Gerstner	IBM	67.5	61.8	9%	8
5	Michael Dell	Dell	65.5	66.6	-2%	5
6	Larry Ellison	Oracle	64.8	66.0	-2%	6
7	Scott McNealy	Sun	63.6	66.7	-5%	4
8	Carly Fiorina	Hewlett-Packard	61.0	61.6	-1%	9
9	C. Michael Armstrong	AT&T	59.0	61.0	-3%	10
10	George Samenuk[2]	Network Associates	57.3	N/A	N/A	N/A
11	Ivan Seidenberg	Verizon	56.9	50.1	14%	17
12	Joe Nacchio	Qwest	56.6	49.1	15%	18
13	Joe Tucci[3]	EMC	56.5	N/A	N/A	N/A
14	Bernie Ebbers	WorldCom	56.3	55.5	1%	12
15	John Roth[1]	Nortel	55.7	62.5	-11%	7
16	Hasso Plattner	SAP	55.7	47.9	16%	21
17	Michael Capellas	Compaq	55.2	53.6	3%	15
18	Bill Esrey	Sprint	55.1	54.9	0%	13
19	Bruce Claflin[4]	3Com	54.9	N/A	N/A	N/A
20	Ed Whitacre	SBC	54.3	48.9	11%	19
21	Sanjay Kumar	Computer Associates	53.3	47.1	13%	22
22	Duane Ackerman	BellSouth	53.2	46.3	15%	23
23	Serge Tchuruk	Alcatel	53.2	38.7	38%	25
24	Jack Messman[5]	Novell	50.2	N/A	N/A	N/A
25	Henry Schacht[6]	Lucent	46.7	N/A	N/A	N/A

[1]Still CEO when survey conducted.
[2]Replaced Bill Larson, 2000 rank 14.
[3]First time in survey.
[4]Replaced Eric Benhamou, 2000 rank 16.
[5]Replaced Eric Schmidt, 2000 rank 20.
[6]Replaced Richard McGinn, 2000 rank 11.

POWER ON THE RISE

Based on a scale of 1 to 100, almost half the CEOs in this year's survey gained power over last year. But of those, three still fell in rank (in bold), and two merely retained their high 2000 spots (in red).

CEO	2001 Power Rating	2000 Power Rating	Gain	2001 Rank	2000 Rank
Serge Tchuruk	53.2	38.7	38%	23	25
Hasso Plattner	55.7	47.9	16%	16	21
Joe Nacchio	56.6	49.1	15%	12	18
Duane Ackerman	53.2	46.3	15%	22	23
Ivan Seidenberg	56.9	50.1	14%	11	17
Sanjay Kumar	53.3	47.1	13%	21	22
Ed Whitacre	54.3	48.9	11%	20	19
Louis Gerstner	67.5	61.8	9%	4	8
Steve Ballmer	72.5	69.1	5%	2	2
Michael Capellas	55.2	53.6	3%	17	15
Craig Barrett	69.2	68.3	1%	3	3
Bernie Ebbers	56.3	55.5	1%	14	12

POWER BROWNOUTS

Although respondents gave seven CEOs a lower score this year than last (on a scale of 1 to 100), only two dropped in the rankings (those in bold) — and two still climbed (those in red).

CEO	2001 Power Rating	2000 Power Rating	Loss	2001 Rank	2000 Rank
John Roth[1]	55.7	62.5	-11%	15	7
John Chambers	73.0	76.7	-5%	1	1
Scott McNealy	63.6	66.7	-5%	7	4
C. Michael Armstrong	59.0	61.0	-3%	9	10
Michael Dell	65.5	66.6	-2%	5	5
Larry Ellison	64.8	66.0	-2%	6	6
Carly Fiorina	61.0	61.6	-1%	8	9

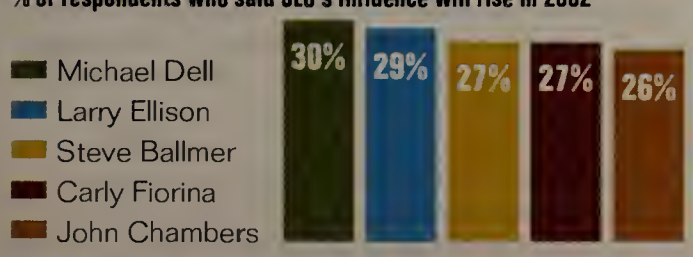
[1]CEO when survey conducted; has since been replaced by former CFO Frank Dunn.

POWER SWINGS Here's how survey respondents believe various vendor CEOs will fare in the year ahead.

Top power gainers

Survey respondents slightly favor Dell CEO Michael Dell in their determination of who will gain power in 2002.

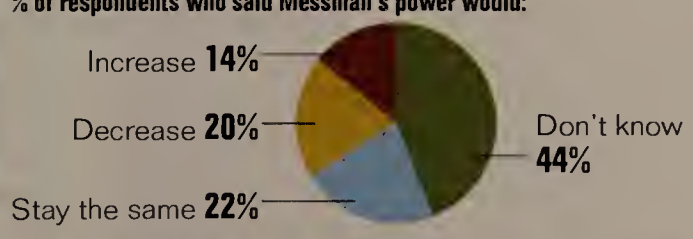
% of respondents who said CEO's influence will rise in 2002



Questionable influence

The jury is still out on CEO Jack Messman's influence at Novell, but few think he will gain power in 2002 and more name him likely to lose than any other CEO.

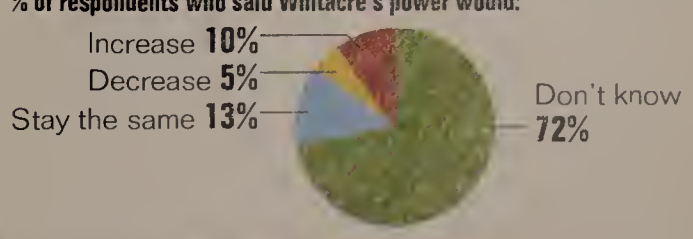
% of respondents who said Messman's power would:



Big if

SBC CEO Ed Whitacre today faces an unclear future as survey respondents struggle to understand how the telecom industry will fair long term.

% of respondents who said Whitacre's power would:



To see how vendor companies rated, and for an explanation on how we conduct our Powerometer survey, go to page 12.

POWER STRUGGLES

Our guide to four contentious issues playing out in the network industry.

- RBOCS GO THE DISTANCE
  See story at right.
- CAN ETHERNET BE YOUR MAN?
  Page 51.
- THE VPN PERFORMANCE GAME
  Page 53.
- TRASH TALK OVER DATA DISPOSAL Page 55.

RBOCs continue their march into long-distance, but gains won't necessarily lead to success in the enterprise market.

With much-sought-after regulatory approvals in or close at hand, regional Bell operating companies are raising the ante in the long-distance game.

Traditional long-distance carriers AT&T, Sprint and WorldCom are pitted against the RBOCs — BellSouth, Qwest Communications, SBC Communications and Verizon — because they'll lose business as RBOCs win it. While RBOCs haven't gone head to head with long-distance carriers for big enterprise voice-and-data contracts yet, they have been successfully encroaching on the consumer market.

Early cases show RBOCs taking residential market share from competitors. For example, one year after launching long-distance service in New York, Verizon has already captured almost 20% of the residential market.

For their part, competitive local exchange carriers doggedly fight RBOC long-distance plans out of fear of losing open access to local Bell networks, says Maureen Flood, director of regulatory and state affairs for the Competitive Telecommunications Association (CompTel), a group representing a broad assortment of CLECs and interexchange carriers. In their local service areas, RBOCs are prohibited from offering long-distance voice and data services until they convince the Federal Communications Commission that they've opened their networks to local competitors. Section 271 of the Telecommunications Act of 1996 outlines this basic rule. The FCC is supposed to ensure that local competition persists after it grants an RBOC long-distance approval.

Skirmishes on the Hill

Much to CompTel's dismay, RBOC proponents on Capitol Hill are pleading the Bell case for easing the 271 approvals process. The best-known piece of legislation is the Tauzin-Dingell Bill, named for its co-sponsors Rep. Billy Tauzin (R-La.) and Rep. John Dingell (D-Mich.) In a nutshell, Tauzin-Dingell would let RBOCs into the long-distance data market without going through the entire 271 process. (They'd still have to prove open network access before being allowed to offer long-distance voice services.)

The bill's supporters say the legislation will induce RBOCs to roll out broadband services. The current rules, which force the RBOCs to offer competitors space on their broadband networks, don't give the RBOCs enough incentive to roll out broadband on a wide scale, they argue.

On the other hand, detractors say the bill would give the RBOCs strangleholds on DSL and discourage them from opening network access to competitors.

Another bill, introduced in the Senate earlier this year, is more to CompTel's liking. It aims to ensure open network access. This

RBOCs go the distance

BY MICHAEL MARTIN

bill, sponsored by Sen. Ernest Hollings (D-S.C.), calls for the RBOCs to be split into wholesale and retail units.

As the bills wind their way through Congress, they renew the interest in the RBOC long-distance debate. Still, observers say it's unlikely that either bill will pass both houses.

ILLUSTRATION BRAD YEO

Pushing into the enterprise

Wrangling on the Hill aside, this year has seen considerable activity on the RBOC long-distance front. Verizon, which until this year only offered long-distance in New York, has added Connecticut, Massachusetts and Pennsylvania to its roster, and plans to file for approval in New Jersey before year-end. SBC, which won long-distance approval in Texas in 1999, now also offers service in Kansas and Oklahoma, and seeks approval for Arkansas and Missouri. BellSouth is waiting for approval in Georgia and Louisiana, and Qwest expects to file for the go-ahead in at least one state before 2002.

With 20% residential uptake rates, aggressive RBOC moves into long-distance are no surprise. And it's no secret why the RBOCs are so successful: They have relationships with all local phone users, most of whom like the simplicity they get with one provider and one bill.

Securing enterprise business will be trickier. For starters, many companies have offices across the U.S. Even if an RBOC manages to win long-distance approval in all states it currently serves, it's going to have trouble offering long-distance beyond that territory where it doesn't have a solid network infrastructure in place.

Verizon and SBC have approached the enterprise market by bidding on small, in-state chunks of large enterprise accounts, says Stephen Shea, managing director for TechCaliber, a company that helps large companies put together telecom bids. So far they haven't had much success, he says. "Their offers for the big guys just aren't all that appealing. The large guys want to simplify their vendor management. They don't want one vendor, but they also don't want many. Until the RBOCs have national coverage, there's no way they can compete," he says. And they aren't offering any price breaks a customer can't get from another long-distance carrier, Shea adds.

RBOC salesforces can't compare, either, Shea says. "They're not on par with the interexchange carriers there. They don't have the relationships they need at the CIO level."

Still, even if they're not chomping at the bit to switch providers, enterprise customers are following the 271 approvals process with some interest.

Doug Hogue, project manager of telecommunications for UniFirst, a uniform manufacturer with offices across the U.S., follows what's taking place but isn't convinced RBOC plans for enterprise business are far enough along to consider seriously. They don't necessarily have the customer service infrastructure in place to deal with large business customers, he says.

Plus, Hogue says, many companies are locked into long-term deals with their existing long-distance providers and couldn't switch any time soon, even if they wanted to. UniFirst gets its long-distance service per terms of a multiyear contract with its carrier.

A regional thrust

One business segment in which the RBOCs could have some success is the regional enterprise.

"Companies that are going to see the biggest impact will be those with their headquarters in an RBOC's region and all their branch offices within that same RBOC's 271 territory," says Thomas Nolle, president of consulting firm CIMI Corp., and *Network World's* monthly Reality Check columnist.

Only Verizon is currently close to achieving any significant regional mass, with approval in New York and Pennsylvania, and pending approval in New Jersey, Nolle says. But by this time next year, all the RBOCs could have strong offerings for regional businesses. Corporations might see some savings in data pricing and get access to new services, Nolle says. Through RBOC long-distance, a company with a corporate office in New York might be able to use an Ethernet link to send data to a data center across the Hudson River in New Jersey.

However, Nolle says long-distance voice pricing is about as low as it can go, and more competition likely won't change prices much.

Ultimately, the RBOCs might move to squash the long-distance competition through acquisition — hence the continued rumors of acquisition talks between AT&T (or Sprint) and one RBOC or another. They'll need the networks and relationships that the existing long-distance carriers possess to become serious enterprise players. ■

The POWER Issue

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POWER STRUGGLES

Ethernet in the MAN offers bandwidth at attractive prices, but will technology and availability limitations keep it from overtaking frame relay and ATM?

Can Ethernet be your MAN?

BY KIMBERLY CAISSE

Today's Ethernet is mature, fast and flexible enough to support data links to metropolitan- and wide-area networks. To hear Ethernet's proponents talk, the LAN favorite is muscling onto the wide-area scene tornado-fast. But its detractors point out that it's not ready to displace existing high-speed services such as frame relay and ATM altogether. Ethernet's limited availability and lack of several important functions, such as failover protection and multiprotocol support, are its weaknesses.

ILLUSTRATION BRAD YEO

Still, Ethernet shows enormous potential. At speeds that range from 1M to 1G bit/sec, it's as fast as frame or ATM, and companies can select a speed anywhere in that range.

Acts Retirement-Life Communities in West Point, Pa., replaced 10 of its frame relay links with Ethernet from Yipes Communications, with seven sites remaining on its previous WorldCom frame relay network because Yipes doesn't offer service to them, says Dan Brindell, director of network engineering at the organization. When using frame exclusively, he set most of the sites, located in four East Coast states, at 256K-bit/sec Committed Information Rate (CIR). Some of the larger sites got 384K-bit/sec CIR, Brindell says.

"The most exciting part of [our] Ethernet service is the ability to purchase the amount of bandwidth we need in increments of 1M bit/sec," Brindell says, adding that his company purchased 3M, 5M or 9M bit/sec, depending on what each of its locations needed. "Contrast that to traditional carrier offerings where you get a choice of T-1 [1.5M bit/sec] or T-3 [45M bit/sec], and nothing in between."

Nothing may be an exaggeration, but certainly frame and ATM lock customers into set amounts of bandwidth. Frame port speed starts at 56K bit/sec, and can increase in 64K-bit/sec increments until a customer reaches 45M bit/sec. To go beyond 45M bit/sec, a customer must buy more frame ports. ATM supports transmission speeds of 1.5M, 25M, 100M, 155M, 622M, 2.5G or 10G bit/sec.

And bit for bit, Ethernet costs less, too.

Sean Curry, chief network engineer at Calpine in Houston, moved to Yipes from AT&T's ATM service to link three offices in a Houston MAN. Originally, the energy company's Houston office multiplexed two T-1 lines to provide 3M bit/sec of bandwidth for its link to an ATM cloud, with a T-3 line to provide access from the core. Calpine also had a 1M-bit/sec CIR on a permanent virtual circuit running between the main office and the core network, he says.

Today, Calpine's Ethernet service provides two 200M-bit/sec MAN links, two 20M-bit/sec MAN links and one 10M-bit/sec Internet connection at its Houston office, Curry says. Calpine plans to install the same connections at a facility in San Jose. The company also wants to install a 100M-bit/sec cross-country link in the next six months.

"I'd say on average for the same bandwidth, I paid AT&T 10 times what I pay Yipes," Curry says.

Brindell agrees that Ethernet is a bargain. Compared with its frame relay network, Acts Retirement-Life Communities is now "getting more than 10 times the bandwidth for about a 20% increase in monthly fees," he says. "The Ethernet MAN is a good fit for midsize companies like Acts Retirement-Life Communities. Larger companies typically already have T-3s. Midsize companies like us can't cost-justify a T-3 but we need more than a T-1."

POWER STRUGGLES

Yet to even consider Optical Ethernet, a company must be in a large metropolitan area. Providers such as Yipes, Cogent Communications and Telseon are only present in the top 20 U.S. cities. Start-up GiantLoop Network, which builds customized networks for large companies, has customers in 10 cities in the U.S. and one overseas.

Qwest Communications and AT&T, the first of the established carriers to announce Optical Ethernet services, have even more limited locales. In May 2001, Qwest began offering its Dedicated Internet Access over Ethernet service in seven major cities, including Dallas and Washington, D.C. By December, the service was available in more than 20 markets, a Qwest spokesperson says.

AT&T launched controlled introductions of its Optical Ethernet services in September. While service providers can tap into the service in 100 metropolitan areas, enterprise users can only get it in New York and San Francisco.

Availability aside, some users wouldn't choose Ethernet even if they could. Terry Korus, product service manager at Bemis, a packaging manufacturer in Minneapolis, simply says he is satisfied with his company's frame relay service from AT&T.

T-1s easily satisfy bandwidth requirements at Bemis' three sites in Minneapolis, Korus says. Bemis' corporate headquarters connects to the two other sites via point-to-point T-1 connections. The corporate site has two AT&T Integrated Network Connection Service (INCS) ports, which let speeds vary dynamically based on the amount of voice traffic present at any given time. "I get more than a T-1 out of a single T-1" with INCS, he says.

And in Oshgosh, Wis., where Bemis built its own T-3 MAN between 10 sites, Ethernet service isn't available. Speeds between the sites vary from 1.5M to 45M bit/sec. While Korus keeps an eye on Optical Ethernet and other MAN services, such as upgrades in SONET, Bemis is not in dire need of them.

"It's fair to say a good portion of industry can sit back and watch the shake-out" in the MAN, Korus advises.

Multipoint and counterpoint

Technologically, Ethernet has some maturing to do. It lacks the multiprotocol support, point-to-multipoint capabilities, high reliability and rapid failure detection needed by large companies with older, mission-critical applications.

Ethernet lends itself to companies that move "a lot of packetized IP data," says Martin Capurro, director of Dedicated Internet product management at Qwest. "What it's not really suited for just yet is nonpacketized information that's still a large portion of your voice communications and some of your legacy data protocols like SNA or X.25," he says.

That's one reason why GiantLoop designs customer networks to run various protocols, such as Enterprise Systems Connection, Fiber Connection and SONET over a dense wavelength division multiplexing infrastructure, says Jon Olstik, vice president of marketing and strategy. "The amount of [Ethernet] bandwidth being generated by our customers is very small relative to the multiprotocol requirements that we're seeing," he says.

And although Ethernet is an inexpensive way to establish point-to-point connections, many large companies with remote offices need multipoint capability. "It takes sophisticated algorithms to find new paths through, say, a mesh network," says Jennifer Nisenoff, data product manager in AT&T's local data services group. "I don't think the [Ethernet] switches are there yet."

But Ethernet MAN users shrug off these failings. A meshed network probably wouldn't provide Acts Retirement with "useful redundancy if it ran over the same physical facilities," Brindell says. "I'm looking for redundancy to avoid outages from cable cuts, equipment failures and the like."

Besides, Brindell adds, Acts Retirement's frame service was, and still is, point-to-point. "I don't consider that to be a serious limitation," he says.

Calpine has three point-to-point Ethernet links that form a triangle between its Houston offices, Curry says. But Calpine could move to point-to-multipoint service, if it wanted, through a virtual LAN. The Ethernet switches "run 802.1Q trunking already, so having multiple points of a customer network appear in the same VLAN tag should be right up [Yipes'] alley," he says.

Point-to-multipoint support will probably happen when Ethernet switches become more prevalent in MANs and WANs and more sophisticated network operating and management systems are developed, Nisenoff says. And that's in the works. The IEEE's Ethernet in the First Mile working group is in the early stages of developing standards for point-to-multipoint fiber links as well as point-to-point copper and fiber links, says Howard Frazier, president of Dominet Systems and working group chairman.

Frame and ATM fight back

Ethernet may be older than frame or ATM, but its failure detection and response rate (typically called failover) and reliability rates fall short for some high-end applications such as voice and database mirroring. Since their inceptions 10 years ago as WAN and MAN technologies, frame relay and ATM have been perfected to meet these higher service levels.

Frame and ATM provide things such as 99.999% reliability, failure detection and response rates of up to 50 msec, low latency and quality of service (QoS). Ethernet offers 99.995% reliability and failover times between 3 and 30 seconds.

"Some of the newer technologies may reach the point where they can be on the same par as frame, but frame has these key attributes in the marketplace today," says Tim Halpin, vice president and treasurer of the Frame Relay Forum.

The same can be said about ATM services. "The customer who wants data, voice, video and video-conferencing" can get it with ATM, says Rick Townsend, president of the ATM Forum. But customers with a lot of data traffic may not need the QoS or timing features in ATM. "For them, a bandwidth-centric [service] like Ethernet is a perfectly viable choice," he says.

Just as Ethernet is evolving to meet the needs of metropolitan customers, work is under way to make frame and ATM more useful to existing customers.

IP VPNs are being added to frame networks so companies can reduce the communications costs of their remote offices. AT&T's IP VPN service, which runs IP-over-frame, lets remote offices of its frame customers tap into a VPN through dial-up, Ethernet or whatever type of connection the remote office dictates. These customers can use "all the existing assets of their frame equipment to create an IP VPN," Halpin says.

Meanwhile, several start-ups are busy trying to make ATM bandwidth more flexible. Companies such as Gotham Networks, Equipe Communications and WaveSmith Networks are developing next-generation ATM equipment that lets bandwidth be metered, says Michael Howard, principal analyst at Infonetics Research. Ultimately, this could invigorate ATM. "If you look at the metropolitan area, even though there is more data traffic than voice traffic, most of the revenue being generated is by voice traffic," Howard says.

With the competition in pricing and technology that Ethernet MAN services are sparking, no matter how the battle progresses, user companies have already won.

Caisse is a freelance writer living in Massachusetts. She can be reached at kcaisse@gis.net.

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Improving Ethernet

Various groups are working to solve Ethernet's shortcomings as a MAN transport technology.

How big Ethernet wins in the metropolitan-area network depends largely on the work of at least two standards bodies.

The 50-member Metro Ethernet Forum is addressing Optical Ethernet's shortcomings "such as lack of resiliency and the inability to carry [time division multiplexing] traffic," says Nan Chen, the forum's president.

New Optical Ethernet equipment is being developed with wave division multiplexing (WDM) integration, Chen says. This equipment will add recovery rates and TDM support "comparable to that achieved in SONET networks," he says.

Currently, Ethernet's Spanning Tree Protocol provides a failure-and-recovery time — commonly known as failover — that ranges between 3 and 30 seconds, according to Kamran Sistanizadeah, CTO at Yipes Communications.

This failover rate is usually adequate for most data communications customers, he says. However, it can be improved by the standard being proposed by the IEEE's Resilient Packet Ring Working Group, Sistanizadeah says.

The proposed standard seeks to create an additional media access control (MAC) layer for use in Layer 2 fiber ring topologies, says Mike Takefman, the working group's chairman and manager of engineering at Cisco. "Rings are a well-known and widely deployed technology in the metropolitan space for building networks with redundancy," he says.

If approved, the new MAC layer could be used in LANs, MANs and WANs at speeds ranging from 100M bit/sec to more than 10G bit/sec.

— Kimberly Caisse

The VPN performance game

Hardware and software VPN vendors go head to head over performance. What you need to know about their claims.

BY TIM GREENE

In their struggle to gain new business, VPN vendors are engaged in a heated debate these days about speed. But most enterprise users aren't swayed by anyone's grand performance claims.

In general, the hardware vendors say their devices encrypt packets at faster rates than the highest speeds claimed by the software bunch.

Hardware VPN vendor NetScreen Technologies claims its NetScreen-1000 can process 1G bit/sec of VPN traffic, and RapidStream says its top-of-the-line RapidStream 8000 hits 360M bit/sec. Meanwhile, Cisco says its top software VPN gear, PIX 535, does 100M bit/sec of Triple-DES VPN encryption. Check Point Software's VPN software runs on general server platforms and other vendors' custom-made hardware. Of these, Check Point points to the Nokia IP740 as the fastest, citing that vendor's clocking at 150M bit/sec.

The need for speed

All of this talk about speed and the ensuing struggle among VPN vendors to prove themselves fastest are borne out of a few market conditions.

One is the increasing availability of Ethernet access services and enterprise use of these services to connect data centers to the Internet. In these cases, sometimes sheer speed wins the day, as it did at Solid Systems, a Houston company that runs data centers in which corporations can house gear and lease storage capacity.

Solid Systems gets its VPN speed from the NetScreen-1000, which can handle the company's user base and, importantly, quickly add VPN sessions (a strength of custom processors), says Steve Koinm, Solid Systems' vice president of strategic technology. "I'm concerned about speed, and in our network I've never even seen this thing breathe hard."

Traditionally, anyone shopping for this equipment on speed alone would choose a hardware-based product built around specialized integrated circuits rather than one based on software and general-purpose processors, say analysts who pore over performance reports. "When you run things in hardware, they're always much more scalable," says Zeus Kerravala, a research director at The Yankee Group.

But software VPN vendors are tweaking their products and using network processors to power them. With these updates, software VPNs are making gains against hardware ones, says Jeff Phillips, an analyst with TeleChoice.

In the PIX 535, Cisco included dedicated processor cards to handle VPN encryption and boost performance. And Check Point has begun offering load-sharing software that lets users strap up to five VPN gateways together to boost total throughput at one site to 1.2G bit/sec. In addition, it's overhauled its VPN-1/Firewall-1 to make it easier for hardware designers to isolate individual VPN software processes for more efficient processing. Check Point partners are still adopting this next-generation software release. Start-up CrossBeam claims its upcoming gear can push the throughput of Check Point's VPN-1 to 2G bit/sec.

ILLUSTRATION BRAD YEO

"With all the right hardware components ... you can often make the software-based VPN controller run just about as efficiently as a hardware-based VPN appliance," says Ed Mier, founder of testing firm Miercom, and member of *Network World's* Global Test Alliance (see www.nwfusion.com, DocFinder: 7336).

Why the speed greed?

When it comes down to it, though, the flap over speed can be unnecessarily confusing. Solid Systems' Koinm, with his priority on speed, is more of the VPN exception than the rule. Network executives generally don't make buying decisions based on the fastest boxes possible. Rather, they buy VPN gear to protect the particular size connections they happen to have.

If connecting sites fed by a T-1 or lower-speed link, performance drops out of the equation. Hardware and software VPN devices can fill the pipes, says Kevin Tolly, president of testing firm The Tolly Group, and a *Network World* columnist.

It is with higher-speed Internet connections — T-3, 10M, 100M and 1G bit/sec — that performance between hardware and software matters, Phillips notes.

In this range, where hardware and software vendors' claims about performance over-

POWER STRUGGLES

lab, you need to beware, Tolly says. Performance claims might not only be confusing, but also downright misleading.

Read Cisco's PIX 535 product literature and you'll find that if you add the extra dedicated processors, called VPN accelerators, the gear can deliver 100M bit/sec throughput and support 2,000 IP Security tunnels over Gigabit links.

But The Tolly Group found that the PIX 535 achieves 109M bit/sec with 1,400-byte packets being run through it from Gigabit Ethernet ports, Tolly says. That number dipped to 80M bit/sec when the testers used 512-byte packets — the processors being strained by the need to handle more packets per second. Of course, the traffic in an enterprise network would be of various sized packets, depending on what applications were running.

In a written rebuttal of these results, Cisco says internal tests show the PIX 535 performing better — in some cases 37 times better — than The Tolly Group reports.

The Tolly Group ran the same test on the NetScreen-500, a hardware-based VPN device touted by the vendor as being able to hit 250M bit/sec VPN Triple-DES throughput. Its tests, which NetScreen commissioned, showed 136M bit/sec throughput with 512-byte packets and 230M bit/sec with the larger packets.

While NetScreen didn't hit its touted numbers in the high-stress, small-packet tests either, it hasn't taken issue with The Tolly Group tests.

"With all the right hardware ...you can often make the software-based VPN controller run just about as efficiently as a hardware-based VPN appliance."

Ed Mier
Founder of Miercom

Performance claims being what they are, the advice for network executives evaluating VPN options is not to get caught up in the back and forth between hardware and software vendors over performance. Speed is important, but it doesn't rule the day.

SCINET, a healthcare applications service provider in Scottsdale, Ariz., chose SonicWall's hardware VPN gear because the devices were easy to configure and distribute, and because they filter for viruses. Plus, SCINET didn't have to worry about the security of the underlying operating system as it would have had to if it had ported VPN software to a general-purpose server, says Ryan McConky, senior systems/network engineer at the company.

"This had everything we needed in one box," he adds.

Rich management features can also be an important factor in networks with several sites, says Paul Kahyet, chief systems engineer for Schlumberger Network Solutions. The company uses Check Point VPN software-based gear in networks it runs for Schlumberger's petroleum arm as well as for other corporations because it is easy to manage and lets new sites be added by making server entries and having all network equipment updated automatically. Raw performance was secondary. ■

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Making data disposal a part of your information management strategy can put an end to the strife between IT and users over storage and help keep the corporate network clean.

Trash talk over data disposal

BY SUSAN MARKS

DRIVE FULL. MAILBOX OVERLOADED. DISK IS FULL. Messages such as these are part of everyday life on a network as companies struggle to manage information.

ILLUSTRATION BRAD YEO

The reminders are supposed to signal users to delete files and get unnecessary or outdated data off networks. Usually originating from a source such as Systems, Lotus Notes Administrator or Network, the user can't respond. Although meant to be innocuous, the unwelcome intrusions almost always elicit complaints, and sometimes even animosity and resentment toward network staff. The result can be a power struggle between IT, whose job it is to keep the network and systems running smoothly, and anyone who wants to store data. IT is perceived as the bad guy who arbitrarily wants data off the network and out of the database, making life difficult for all.

" 'LAN is full.' They're always saying that, and there never seems to be any rhyme or reason," says one typical disgruntled user on a large network.

IT vs. the rest of the company is a natural conflict, one that complicates already-difficult technology decisions and ultimately saps the value IT systems provide. Data storage doesn't have to be a battlefield, but it often is because disposal rules are typically omitted from corporate information-management policies, says Steve Weissman, president of consulting and research firm Kinetic Information. "Everyone is wrapped up in capturing and storing data, not disposing of it," he says.

Disposal guidelines

Experts agree that network executives who have developed sound data-disposal policies — usually in collaboration with other department heads, top corporate officials and the legal department — can end clashes between IT and users over how much network and systems space everyone is afforded.

Such is the case at Ashland, a Fortune 250 chemical and petroleum company in Covington, Ky. It has had an information management policy for more than 20 years that doesn't illicit rancor between network staff and the rest of the company, says Roger Craycraft, CIO.

Stan Lampe, an Ashland spokesman and a longtime company employee, agrees. Whether data deletions are software-generated or voluntary, there just aren't problems, he says. "It's just something you manage."

Unfortunately, no one-size-fits-all technology solution answers the data disposal problem, Weissman notes. Instead, it is an exercise in business process analysis and review. Who needs to know what, when, under what conditions, in what context, and what are the tools to facilitate that access?

For some types of data, such as medical or tax records, laws regulate minimum retention requirements, but for other information little direction exists. Conceivably, documents could be dumped from a database onto a tape and stored forever. However, the issue then becomes accessing a tape drive that can read the data or a program to process it, says Bob Zimmerman, director of storage research for Giga Information Group.

One solution for data overload is often automatic deletions at the end of a set retention period. At Ashland, that's 90 days for e-mail. At the University of Massachusetts, e-mail gets 60 days before being disposed of automatically, says Ethan Katsh, a professor at the University of Massachusetts Department of Legal Studies and director of the University Center for Technology and Dispute Resolution.

ILLUSTRATION BRAD YEO

To delete or not?

Information management strategists have different views on data disposal.

Data disposal at some companies means removing files from front-line networks to subsequent storage environments and eventual long-term archiving in perpetuity. At others, disposal means a series of preset storage-area network options that end with data destruction.

Bob Zimmerman, director of storage research at Giga Information Group, advocates long-term data storage. Keeping data around is just an expense. Losing the data is sometimes disastrous, he says.

To back up his point, Zimmerman recalls the case of a senior engineer working on seismic data for an oil company. The engineer took a lengthy sabbatical and returned to find all of his data gone. It seems that he was not familiar with the IT department's process of deleting data after 18 months. "So there are upsides and downsides to a data disposal," he adds.

"I never recommend blowing the data away. It is always cheaper to dump it on a tape and send it off to a salt mine, [because] if you ever have to recover some of the stuff that you inadvertently or purposely threw away, recreating it is going to cost you more than you ever saved in all of the throwaways that you made," Zimmerman says.

But Pat Tagtow, senior counsel for BMC Software, questions the wisdom of archiving data for indefinite periods of time. "You may be in a little more organized fashion, but you're not managing in a prudent manner. The concept of the information management program is that you are going to have a manageable amount of information, and when you destroy data or when something is no longer needed, it's gone so you don't have to manage it any longer."

Roger Craycraft, CIO of Ashland, a chemical and petroleum company in Covington, Ky., agrees. When a retention period ends at Ashland, the data is eliminated. "I don't think we want to necessarily [even] be in a position to recover it," he says.

Whatever the final policy, to avoid confrontation with users, initially implement the system so that the data is removed from the disk but backed up so that it can be recovered, recommends Pete Lindstrom, an analyst with Hurwitz Group.

— Susan Marks

Capacity, not time, is the measure used at Giga, Zimmerman says. He gets 75M bytes of e-mail storage on the network. When he exceeds that, which is regularly, he gets an automated warning to delete files — he calls it a "nasty-gram."

If he doesn't comply, he gets a second notice. If he still doesn't clean out his mailboxes, the system prevents him from sending e-mail or receiving any that have attachments.

A storage hierarchy

A network executive's biggest mistake would be to ignore the issue and let people keep stockpiling their e-mails and other data, Weissman says. Storage comes with overhead costs, and indexing, management and network integration challenges. "The one thing you want to avoid is bringing the business to a slowdown because the piece of information someone needs, they can't find. They forget which server it's on, something crashes, or a directory goes down." In such instances, IT becomes the scapegoat.

It's all about hierarchical storage management (HSM), Zimmerman says. HSM software makes decisions about documents, in e-mail or elsewhere, based on age and size, and in accordance with preset management policies. It can enable the automatic migration of archival data to offline or near-line storage that's usually robotically accessible. Then files move transparently back to the disk when a user accesses them. The user only knows that the first reference to the file was a long seek, Zimmerman says. The point is getting the data off the high-performance, expensive front-line storage while still being able to access it when necessary, he says.

HSM products include Veritas Software's NetBackup Storage Migrator, Tivoli Software's Tivoli Storage Manager, K-Par Archiving Software's Archimedia, Computer Associates' HSM for NetWare, Legato Systems' Legato Application Availability Management Solutions and CaminoSoft's Highway Server.

However, not everyone subscribes to infinite storage space — even if it is hierarchical — as the answer (see story at right). Imagine trying to find a tiny item in an attic as big as a baseball stadium where everyone keeps everything they ever possessed. That item might never turn up, says Pat Tagtow, senior counsel for BMC Software in Houston. Data disposal must be a facet of any prudent records-management program, he asserts.

BMC instituted its information management system, including data deletion, during a business boom about two years ago. "It was a quick growth period where we could foresee that if we didn't institute a policy of organizing the information and managing how long we keep it and how we keep it and such, that it could get out of hand," Tagtow says.

The driving force wasn't the need to destroy or delete information, but rather sound business reasons, adds Mark Lagodinski, BMC manager, records management. His department is responsible for implementing BMC's data retention and disposal policy. It's a task made easier, he says, because the company approaches it as an information management issue, as opposed to a data-disposal issue, and from the beginning was upfront with employees.

Highly visible executive buy-in came early on, with the CEO and legal counsel explaining on videos the individual and company benefits of information management, Lagodinski says. Employees received e-mails detailing the benefits and a comprehensive policy book that included schedules on how long different kinds of documents would be retained on the network. Managers also received training on the new procedures so they could go back to their teams and discuss it.

If employees instead had just been hit with rules and guidelines and a firm policy, then perhaps they would have resisted IT, Tagtow says.

But most employees today don't even mind the automatic network reminders that a document is nearing the end of its life. They welcome the notices (courtesy of the company's recordkeeping software, TrueArc's ForeMost Enterprise) as guidance on what to keep and for how long, Lagodinski says.

Setting policies

What is happening at companies such as BMC Software and Ashland, says Kinetic Information's Weissman, is the emergence of an operational philosophy that builds on old records-management practices and incorporates them into today's dynamic e-business environment.

While Ashland disposes of e-mail after 90 days it will keep other documents, such as a study that did not yet turn into a project, perhaps for two years after completion. Deletion would then be manual, Craycraft says.

Historically, regulations and laws have driven most of the data-retention decisions at Ashland. But in general, the company tries to understand what the retention need is for all data in the system, Craycraft says. The IT department works with lawyers, accountants and other interested parties, including users, to ensure the best policy, he adds.

> **"Everyone is wrapped up in capturing and storing data, not disposing of it."**
>
> **Steve Weissman**
> President of Kinetic Information

Talking to all involved parties and finding creative ways to honor their interests is essential to resolving any issue or dispute, including data disposal, says Karl Slaikeu, CEO of Chorda Conflict Management, a consulting and training company in Austin, Texas. The result is an integrative solution, as opposed to a blanket edict. After all, the goal is compliance, not foot-dragging and low morale because someone's interests are violated, he says.

Network executives must be involved in, if not initiating, the discussions, Weissman says. "You can't know how to orchestrate your technology tools until you know what the policies are.... You don't want a fellow on the technology side to just simply create the policies on his own and then start flushing data, because that affects the business. At the same time, you don't want the business people promulgating directives that may be impractical on the technology side. It very much needs to be a partnership."

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Power of the purse strings

These tough times call for new budget negotiation strategies.

BY STEWART DECK

Man, oh man, what a tough year. Across corporations, network projects were trimmed or put on hold. IT spending, although heavily budgeted, was often frozen.

On the plus side, network executives have gained negotiating power against vendors over prices. But even when IT budgets aren't squeezed, senior management now wants far more justification for every dollar spent. The trend is once again zero-based budgeting, where no project is approved — even the annual initiatives — until every dollar is defended.

You need budget negotiation strategies different from those used during the so-called New Economy — when money gushed down on IT like a waterfall — because the next few quarters will likely be a continued drought. Economic improvement isn't likely until well into the first or second quarter of 2002, says John Gantz, IDC's chief research officer. Although IDC predicts next year's IT budgets will grow, the purse holders may not let you spend those bucks until the economy shows signs of revival.

Loosening their grip requires extra preparation on your part and then giving decision makers a reason to say yes.

Frank Hood, vice president of IS at Krispy Kreme, gets the dough he needs for network projects by getting buy-in from business unit heads.

BOB RIVES

Numbers or emotions

Today's budget negotiations require you to understand thoroughly how your CEO and CFO think and what pressures they're under. Are they bottom-line-driven, requiring solid return on investment right off the bat? Do they respond better to a discussion including thoughtful and creative forecasting?

Bob Whyte, formerly the CIO at DirecTV and now CIO at SAP Portals (a division of SAP AG), says speaking the CEO's language is vital. "I could get ahead with one former CEO by showing emotion and banging the table," he says. "With others, [budget success] was purely a matter of how you presented and supported your numbers."

You can learn a lot about preferences by asking successful division budgeters how they handled negotiations. Likewise, premeeting conversations with your CEO and others can clue you in on current pressures.

The goal is to craft arguments that advance your CEO's existing agenda, says Robert Bordone, a Harvard Law School lecturer and deputy director of the Harvard Negotiation Research Project in Cambridge, Mass.

Is the board of directors pressuring the CEO to slash costs, build new revenue streams or support new growth? Once you know, you can decide how to slant your project, emphasizing cost-cutting benefits of the VPN upgrade in one case or its accessibility to smaller business partners in another.

IT may be a crucial hub of many companies, but to the CFO and CEO, it's just one piece of the business. It won't matter how vital you say a new network upgrade is unless they think so, too.

"I focus directly on the business and how [IT projects] will help people and cut costs" instead of how cutting-edge the company can become through IT spending, an appropriate tactic last year, says Kendra Bender, director of networks and IT at Tipper Tie, a Cary, N.C., company that makes aluminum clips and wire machines for the food-processing industry.

A year ago Bender sold the idea of a new customer relationship management system "by showing how we needed it to stay competitive.... Things are way tighter now," she adds, "so now I'm carefully comparing costs with returns. In tougher times it's sometimes better to table some things and revisit them in six months rather than push too hard."

Timing is critical, agrees Frank Hood, vice president of IS at Krispy Kreme, the doughnut company based in Winston-Salem, N.C.

"In tough times, you have to make some choices," Hood says. "Right now, I'll sell network security with a greater degree of urgency than I would the need to switch to a new network infrastructure."

Hood also gathers support for his projects from other company divisions so his larger budget requests carry additional weight and significance, and are therefore harder to turn down.

Honey or vinegar

Some negotiators think tough times require tough talk. But demanding or threatening is the wrong approach to a harmonious compromise. "Good negotiators craft choices that are good for the other side," Harvard's Bordone says.

He recalls that before the September 1978 Camp David peace talks, negotiators asked Israel's Menachem Begin to playact the role of Egypt's Anwar Sadat as part of an exercise. By doing so, Begin realized that Sadat couldn't possibly accept Israel's demands so he modified them to give the talks an opportunity to begin with an initial level of agreement.

"Negotiation is about persuading, not demanding," Bordone says. "Really good negotiators are extremely good listeners who give choices that are easy to say yes to."

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The POWER Issue

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Vision talk

Unless you impart your vision clearly to others, it may never fly.

BY APRIL JACOBS

So you want to be an IT visionary. You need to be, because you can't make every decision for every employee all day long. Your vision has to stand as their guide. Well, all you need to do is tell a compelling IT story that everyone inside and outside of your company understands, trusts and finds motivating.

Nasdaq's Steve Randich says well-articulated, easy-to-understand operational guidance must accompany the network vision.

PHOTO: TRACEY KROLL

OK, it's a difficult task, but with the right skills, it's one you can master.

First, make sure your vision is indeed that. The central point is not to mistake tactics — projects and production goals — for vision. A vision is strategy, while tactics are day-to-day management requirements. Think of it this way: If your job were a novel, your vision would be the plot and your day-to-day management the individual chapters. Also know that a vision is not an attempt to foretell the future. Its role is to prevent a company from focusing so heavily on near-term objectives that it overlooks the major trends that impact long-term health, says Steve Randich, executive vice president of operations & technology at the Nasdaq in New York.

But having a great vision will only get you so far. You've also got to articulate it well. It can't be a guidepost if others don't see it. Often visions are misunderstood because they are abstract. Counter this by expressing the abstract goal (globalization, for instance) and the achievable action items that will make your vision succeed (new systems that handle multiple currencies).

"In order to have effective decentralized decision-making, all employees must understand not only the vision but also the intent of the operational guidance they have been given," Randich says.

When Nasdaq executives envisioned the exchange becoming a truly global marketplace by 2002, IT's tactical projects involved implementation of a new system that used decimalization for stock prices and the rollout of a primary order routing and automatic execution system for Nasdaq National Market securities. Both projects are steps in Nasdaq's plans for implementing SuperMontage, an order display and execution system due in mid-2002, and will enable stock trading for international orders.

These projects were successful because Nasdaq's vision (a global marketplace by a certain deadline) was effectively communicated through clear and attainable steps (three hierarchical projects), Randich says.

Make it personal

A vision should always be expressed in terms that are clearly relevant to the listener. Avoid language that is authoritarian or condescending, and instead focus the message on getting support from the listener, says Sharon Rose Powell, president and co-founder of Princeton's Center for Leadership Training in Princeton, N.J.

When Jeri Lose, CIO of St. Jude Medical Center in St. Paul, Minn., envisioned increasing employee efficiency, she thought her tactic would be implementing a customer relationship management (CRM) application. In talking about CRM with the CEO, she concentrated on how it would help St. Jude better serve its customers and increase employee productivity. "I explained the business need for the technology and made clear what we will be able to do with the technology," she says.

When talking to users, she zeroed in on how the technology will ease their jobs, how they'll receive training and where they can turn for help, she says.

One strategy is to craft phrases geared toward various constituencies. Other business managers and executives want to hear about good return on investment. Salespeople want to know how your plan will improve their relationships with customers and help close deals. Investors, the board and CEO will be moved by how your vision keeps the company competitive, increases growth or reduces costs.

A work in progress

Your words should not just rally the troops, but bring them home without disappointment. Make sure that people understand that while your vision is firm, your tactics are works in progress. This is not simply a matter of using bet-hedging language (that is, words such as "probably," "perhaps," "may," and "if-then"). Ideally, it means knowing that the tactics you propose will lead to the effects you envision.

Kevin Tolly, CEO of The Tolly Group and a *Network World* columnist, suggests using "proof points" you get from testing technology before incorporating it into your vision. This will demonstrate when "a technology that might work well at the vision level is not yet ready for the implementation level," Tolly says. When tests confirm a workable tactic, they also give you the empirical data you need to craft those compelling return on investment and productivity-improvement statements.

Then, with such strong words at the ready, your vision is sure to become what everyone sees. ■

2001 power wrap-up

We plot the year's highs and (mostly) lows in our Power timeline.

Jan. 3
Network Associates gives its CEO slot to George Samenuk, who held that role at business-to-business exchange Tradeout.

Jan. 19
DSL provider NorthPoint Communications files for bankruptcy protection.

Jan. 23
Microsoft botches a router configuration and brings down its Web site for 24 hours. Two days later, a distributed DoS attack knocks the site offline for another half day.

Feb. 2
Novell spins off net content group into a company called Volera, majority backed by Novell with investments by Nortel and Accenture.

Feb. 5
...ns at Microsoft's .Net initiative ...ing Sun ONE, a development ... for building Web applications and services.

Feb. 15
• Dell ditches 1,700 full-time employees, 4% of its workforce, to cut costs.

• Nortel continues layoffs started late last year, raising its count from 4,000 to 10,000.

Feb. 26
Nike blames a weak quarter on i2 Technologies' supply-chain management software.

Feb. 28
Pacific Bell battles three major class action lawsuits over its mass-market DSL offerings, part of a coast-to-coast wave of disgust over Bell DSL promotional practices.

March 2
SBC Communications quietly lays off or reassigns hundreds of out-of-region sales and customer service personnel, stepping back from its pledge to compete in other RBOC territories.

March 6
Sun jumps into the peer-to-peer market by buying privately held peer-to-peer search company InfraSearch.

March 8
Wireless LAN vendor Proxim files a patent infringement suit against 3Com, Cisco and others.

March 12
• Novell announces merger plans with e-business consulting firm Cambridge Technology Partners; Eric Schmidt to step aside.

... 18 7/8, hitting a three-year low after news the ... many as 8,000 regular and contract employees.

March 19
Microsoft unveils Hailstorm, a building block of its nearly year-old .Net initiative.

March 20
• IBM continues its enterprise open systems thrust with a promise of server clusters, code-named Blue Hammer, for Linux and Unix.

• Oracle lays off 866 workers, 2% of its staff, to cut costs.

March 21
Harald Alvestrand, Cisco engineer and longtime IETF participant, becomes the first non-American to head the IETF amid the standards group's efforts to deal with its internationalization.

April 2
Catherine Hapka, CEO of troubled DSL services provider Rhythms NetConnections, resigns.

April 9
Cisco enters the storage network market with one of the industry's first IP storage routers, technology it picked up in its $450 million acquisition of NuSpeed Internet Systems last year.

April 16
Bellwether Cisco slashes third-quarter estimates by 30%, takes $3.7 billion charge.

April 18
• CLEC Winstar files for Chapter 11 bankruptcy protection and, blaming Lucent for its financial woes, sues the company for $10 billion.

• IBM shines by meeting analyst expectations for the second quarter and posting a 15% gain in net income.

March 22
AT&T dishes out $135 million for the assets of failed DSL provider NorthPoint, which shuts down its network one week later.

April 24
IBM set to double its Unix and Windows NT database business by acquiring Informix for $1 billion; deal closes July 2.

April 26
• Pilot Network Services, provider of managed Internet access and security services, abruptly pulls the plug on operations, strands major customers such as the *Los Angeles Times* and Rand.

• Verizon begins offering business and residential long-distance services in Massachusetts.

April 27
IBM reveals eLiza, plans for investing billions of dollars to develop self-managing, self-configuring and self-healing servers.

May 4
FCC Chairman Michael Powell recommends Congress raise penalties on ILECs that violate competition terms in the Telecommunication Act of 1996 from $1.2 million to at least $10 million per violation.

May 7
Dell announces a second round of layoffs with 4,000 more jobs cut.

May 11
• Cisco announces availability of IPv6 features across products that run its IOS operating system software.

• Nortel COO and CEO-heir apparent Clarence Chandran resigns because of health reasons; separately, the company exits the DSL access equipment business.

May 14
IBM outlines comprehensive Web services plan.

May 23
Hackers bring down the Web site of the CERT Coordination Center in a DoS attack.

May 29
EMC drops 1,100 employees, 4% of its workforce.

May 30
Linux gets big backing as Fujitsu, Hitachi, IBM and NEC jointly commit 500 researchers and up to $165 million in a 1- to 2-year project aimed at making the operating system more suitable for use in large organizations.

June 14
Oracle releases 9i database and throws out controversial universal power unit pricing plan for a more conventional processor-based one.

June 15
Nortel adds 10,000 employees to its workforce reduction count, bringing the total cut to approximately 30,000.

June 22
Global Crossing completes a four-year optical network project connecting 200 cities in 27 nations.

June 28
A federal appeals court reverses the breakup order imposed on Microsoft during its antitrust trial ... and sends portions of the case back to the district court.

May 31
Microsoft ships Office XP, the fifth version of the 10-year-old productivity suite, amid details of a new enterprise volume licensing and software upgrade plan that could mean sky-high licensing costs for companies.

June 29
On a rare positive financial note, Cabletron reports strong second-quarter revenue and earnings.

July 8
AT&T receives unsolicited $44.5 billion stock bid for its broadband unit from cable provider Comcast, it rejects the bid less than two weeks later.

January | February | March | April | May | June

POWER SIGN-OFF

Aug. 2
Rhythms NetConnections becomes the second of three national DSL providers to file for Chapter 11 bankruptcy protection; announces one week later that it will begin terminating service on its network and that it has cut its remaining staff by 75%.

Sept. 3
• Hewlett-Packard and Compaq announce deal in which HP picks up Compaq for $25 billion in stock.

• The ANX, the largest VPN-based e-commerce network abandons its multivendor strategy, ending its five-year struggle to get IP Security equipment to interoperate.

Aug. 6
• Code Red II computer worm spreads by exploiting buffer-overflow vulnerability in Microsoft ISS servers, consequently causing network shutdown at workplaces including Motorola and the Associated Press.

• Cabletron finalizes the spinoffs of its subsidiaries: Aprisma, Enterasys and Riverstone Networks.

July 24
Lucent's slide continues as its third-quarter revenue falls short, and another 15,000 to 20,000 layoffs are announced.

July 19
• Nortel posts whopping $19.4 billion net loss, including intangible assets write down and other charges, for the second quarter.

• AT&T Wireless becomes first U.S. carrier to fire up 2.5G service, although with limited functionality.

July 18
Dell enters the market for network switches with low-cost products for small and midsize businesses.

Aug. 7
Cisco meets expectations for fiscal 2001 fourth quarter and year-end results.

Aug. 16
FutureLink, one of the first firms to call itself an application service provider, files for Chapter 11.

Oct. 22
AT&T disbands Concert, its highly touted but little-used global services venture with British Telecom.

EMC announces a five-year, multibillion deal for Dell to resell its enterprise storage systems.

• SBC cuts back Project Pronto plans to invest $6 billion in a broadband buildout by the end of 2002, signals slowing in carrier's commitment to DSL.

• Network Caching Technology sues caching and content-delivery vendors Akamai, CacheFlow, Inktomi, Novell and Volera in a move that could disrupt the delivery of such products and services, and result in higher prices.

Sept. 4
Ellen Hancock resigns as CEO of financially troubled Exodus Communications.

Sept. 6
U.S. Justice Department says it will no longer seek the breakup of Microsoft. Instead, it wants to find a quick remedy in the antitrust case.

Sept. 10
Qwest Communications lays out plans to cut 4,000 workers and revises earning expectations downward for the year.

Sept. 20
• EMC says it will let go 2,400 workers by year-end.

• 3Com posts first-quarter net losses tallying 300% more than the year-ago period; company lays off 6,000 employees, or half its workforce at its 12,000 high in 2000.

Sept. 26
Weighed down by $3.5 billion in debt, Exodus files for bankruptcy.

Oct. 25
Microsoft ships Windows XP Home and Professional editions, its first operating system that combines the 9x and NT code bases and the gateway to its .Net initiative.

Oct. 26
AT&T Wireless closes its fixed-wireless business, taking a $1.3 billion write-off and signaling that this may be a broadband access technology ahead of its time.

Nov. 20
Microsoft signs an agreement for a nationwide settlement of the host of private suits that allege the company overcharged for its software, amends agreement Dec.10 in answer to criticism of the deal.

Nov. 19
IBM brings together 3,000 consultants and 100 researchers in its new Global Services Safety and Security Practice.

Nov. 1
Nortel CFO Frank Dunn (left) takes over for John Roth as CEO.

Nov. 15
Nortel cuts workforce by 1,400, or 19%.

Nov. 29
EMC reorganizes into software, hardware and services operating units.

Nov. 30
Exodus sells out to Cable & Wireless for $575 million, plus the assumption of certain liabilities totaling $180 million.

Dec. 4
• The Goner e-mail virus worms its way across the Internet.

• HP becomes the first major vendor to detail shipping plans for blade servers when it announces January availability for its Powerbar family.

Dec. 5
AT&T drops its $307 million acquisition bid for bankrupt Excite@Home, which confirms it will cease operations in 90 days.

Dec. 14
Covad gets U.S. Bankruptcy Court approval for its reorganization plan. The company should emerge debt-free from its Chapter 11 bankruptcy.

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More online!
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July	August	September	October	November	December

July 11
In its first acquisition of the year, Cisco picks up metropolitan network technology company AuroraNetics for $150 million in stock; grabs VPN accelerator company Allegro Systems for $181 million two weeks later.

July 10
Novell and Cambridge Technology Partners initialize merger; Jack Messman dons the CEO role and begins pushing Novell as services company.

July 9
AT&T splits off AT&T Wireless by converting tracking stock into common shares.

Aug. 8
• The last of the national DSL providers, Covad Communications, joins the Chapter 11 crowd.

• Metricom shuts down its Ricochet high-speed wireless data network in all 15 markets, leaving 34,000 subscribers hanging and 282 people out of jobs.

Aug. 23
Cisco reorganizes, creating central engineering and marketing efforts around 11 technology groups.

Aug. 20
Network Associates' unit McAfee, and start-ups Arbor, Asta and Mazu team on developing end-to-end protection against distributed DoS attacks.

Sept. 1
Inching closer to CEO, IBM's Sam Palmisano takes over as president.

Sept. 11
Terrorist plane attacks bring down the World Trade Center, halting trading and knocking out communications service; crush a portion of the Pentagon; and lead to a fatal crash in Pennsylvania. Industry executives and IT professionals die in the attacks.

Sept. 24
VeriSign buys telephony services provider Illuminet for $1.2 billion in what some consider an ambitious attempt to dominate the emerging IP telephony standard Enum.

Oct. 2
Nortel cuts more jobs, exits more markets, closes more offices and lowers revenue targets as it prepares to record a third quarter loss of $3.6 billion.

Oct. 8
• AT&T Wireless takes control of its largest affiliate, TeleCorp PCS, in a $4.7 billion stock deal.

• Microsoft succumbs to user heat and once again extends the deadline for companies to enroll in its contentious new program for licensing and upgrading software.

Oct. 16
IBM third-quarter earnings decline 19% from a year ago; Compaq's plunge 77%.

Oct. 11
• Sprint quietly shuts down its once-hyped Integrated On-demand Network converged service and lays off 6,000, 7% of its workforce.

• Network Associates disbands its PGP unit and announces plans to sell off the division's firewall and encryption products.

Nov. 13
Covad receives $150 million infusion from SBC that should keep the DSL provider running for the short term.

Nov. 8
Bowing to user pressure for more open systems, EMC and Compaq agree to exchange storage hardware APIs.

Nov. 7
IBM donates $40 million of software to new independent open source community working to develop the Java based Eclipse software.

Nov. 6
Lucent reveals it wants to sell its 1,400-worker enterprise professional services unit by year-end.

Nov. 5
Verizon enters Connecticut business and residential long-distance markets; follows Nov. 7 with long-distance services for enterprise and government organizations in Pennsylvania.

Nov. 2
The Justice Department and Microsoft present a proposed final judgment in their 3-year-old antitrust case to U.S. District Court Judge Colleen Kollar-Kotelly.

Dec. 17
Sun adds Web services to its J2EE server software platform.

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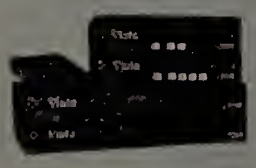

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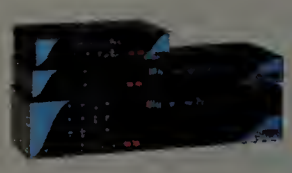

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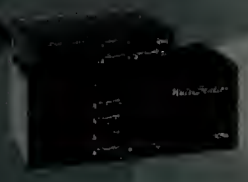

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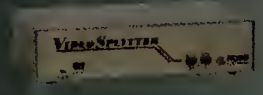

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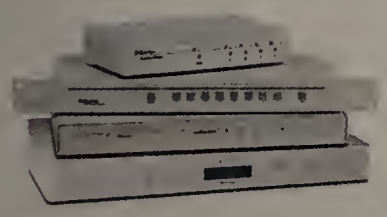

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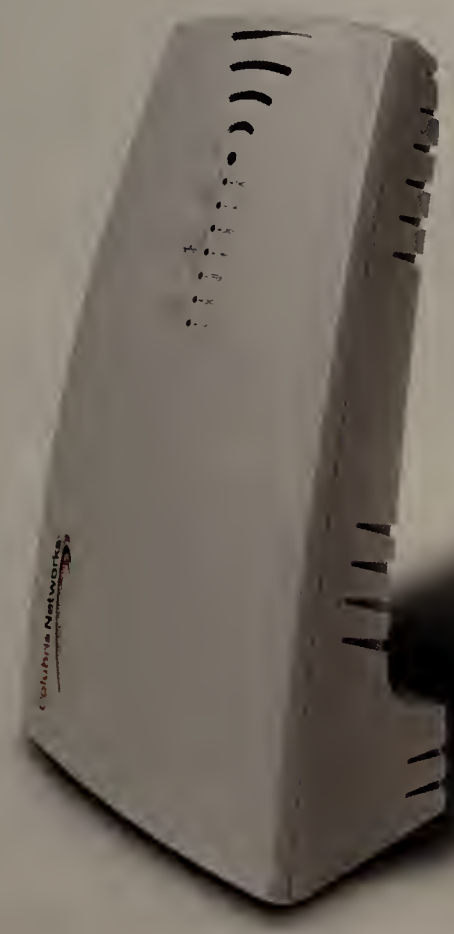

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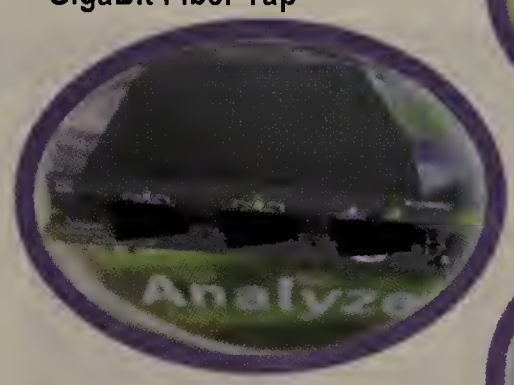

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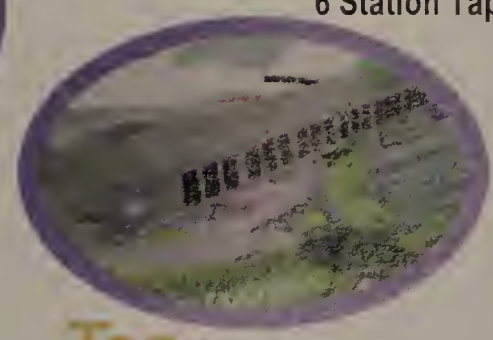

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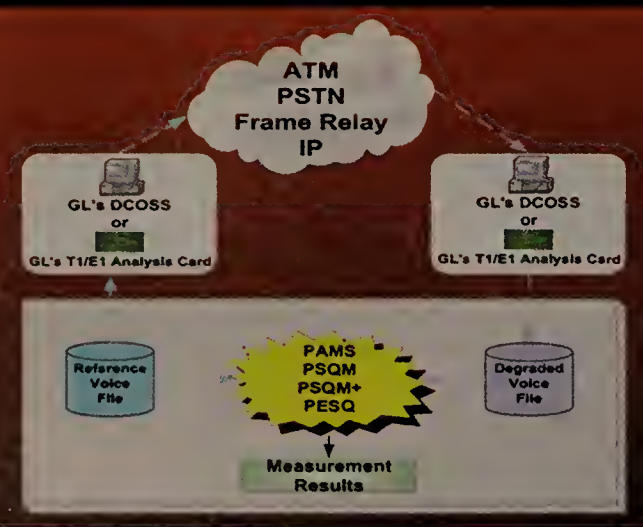

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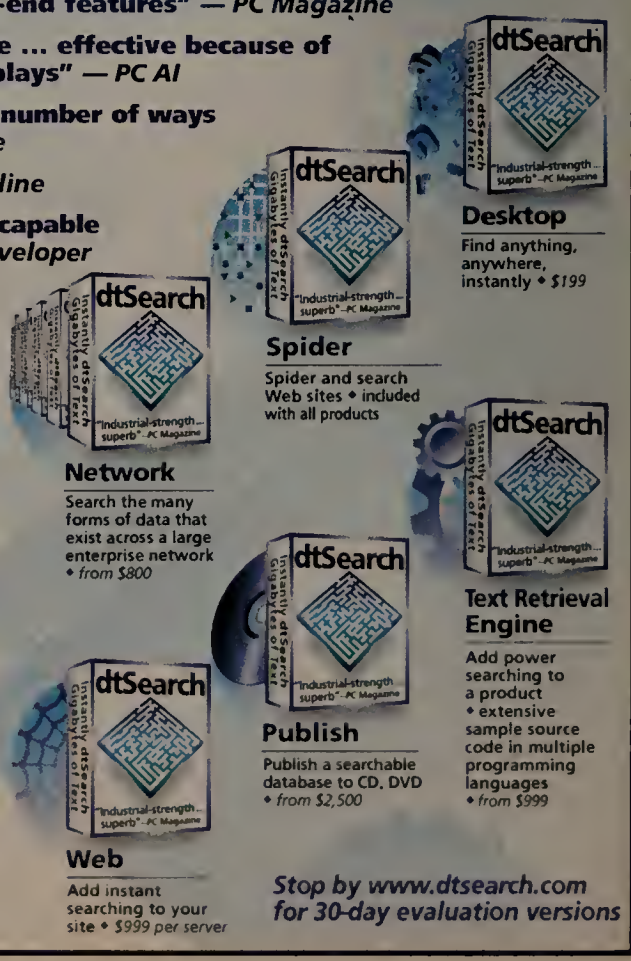

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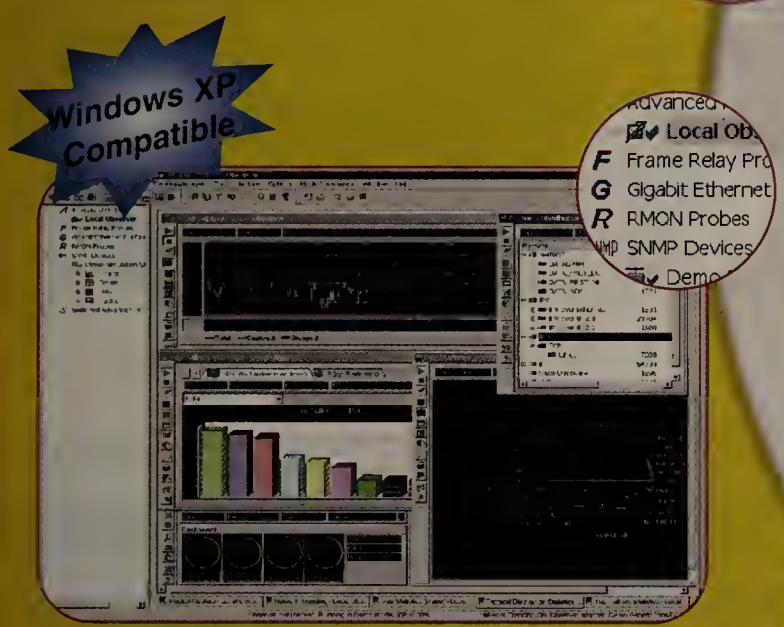

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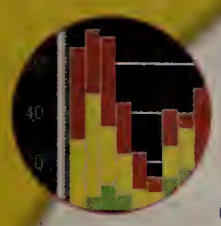

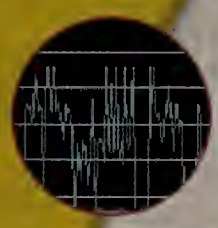

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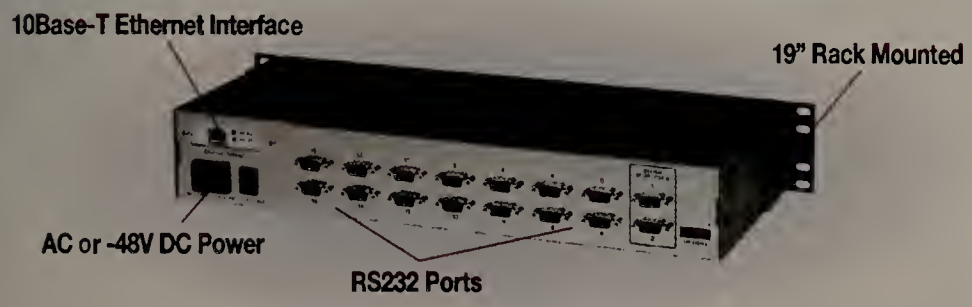

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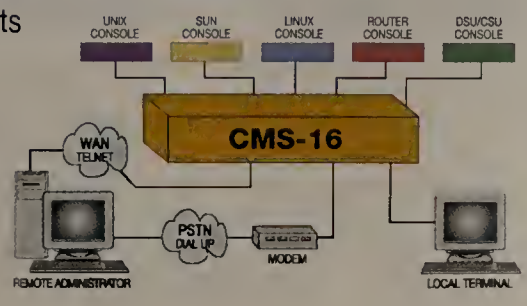

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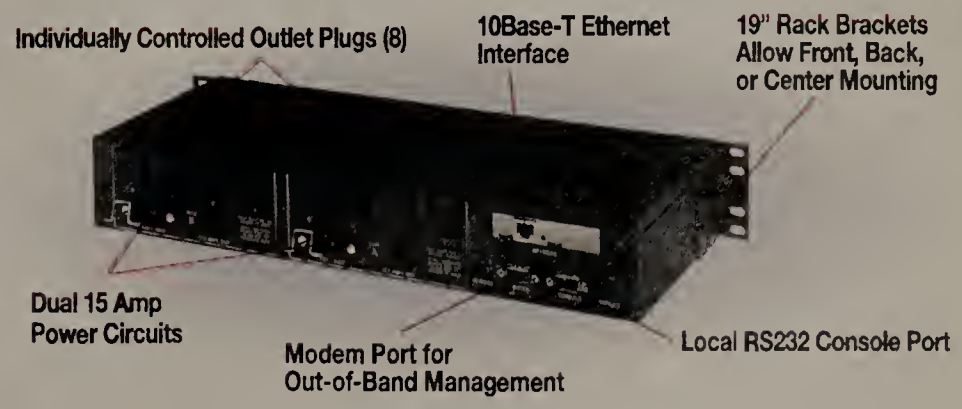

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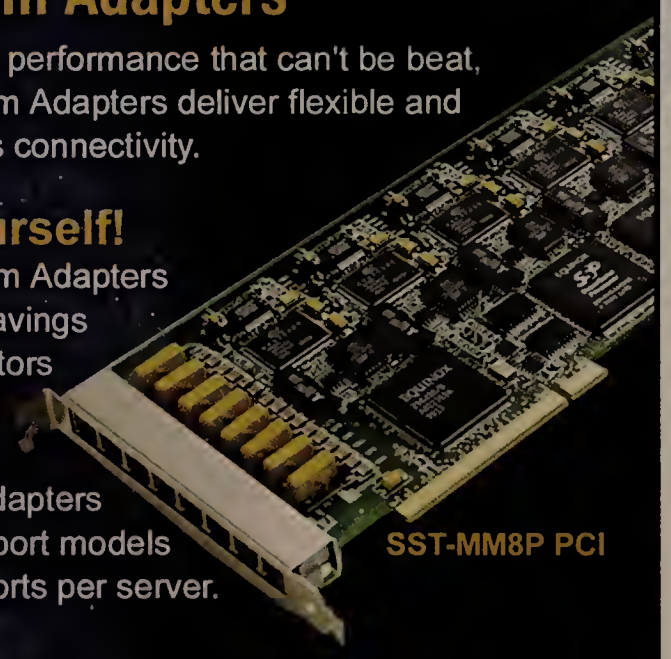

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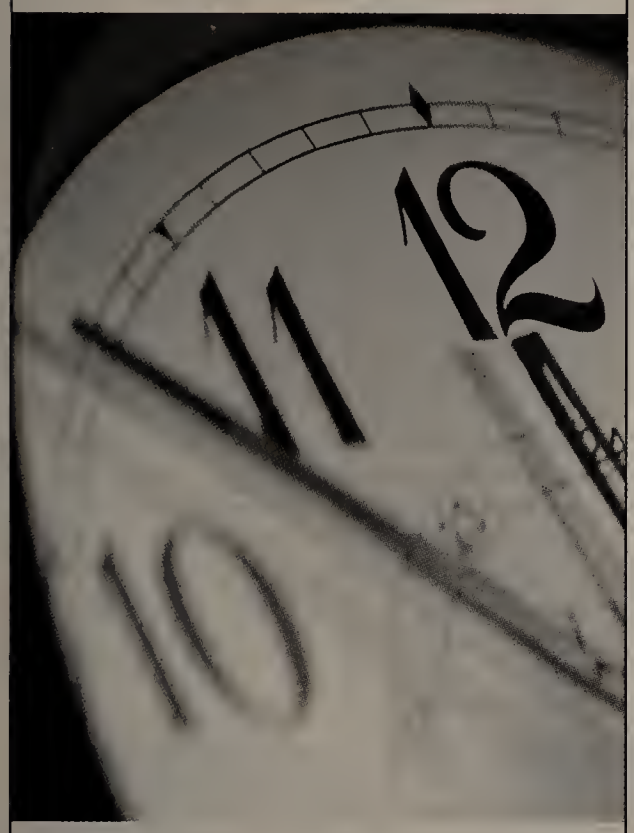

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SYSTEMS ANALYSTS: Advent Global Solutions one of the fastest growing IT service companies requires Systems Analysts to analyze, design and develop operational procedures to automate processing and to develop new systems to improve production. Knowledge of SAP, Oracle, and other business related software is essential. Needs a Bachelors in Engineering/CS or in any related field combined with 5 years relevant experience in designing and developing computer software systems. Please send resumes to Advent Global Solutions, Inc., Human Resources, 17314 SH249, Suite #205, Houston, TX 77064 or Fax. (281) 970-3839.

Acro Service Corp., an IT, engineering and consulting company located in Livonia, MI is seeking IT professionals possessing MS/BS or equiv. and/or relevant work exp. for employment. Work with three (3) of the following: Oracle Web Server, Distributed Operations Management System (DOMS), Designer 2K, Oracle, UNIX Shell Scripting, Pro*C, PL-SOL and Web Deployment. Mail resumes to: Acro Service Corporation, c/o Beth McOueen, 17187 N. Laurel Park Drive, Suite 165, Livonia, MI 48152.

Telecommunication Analyst (F/T). Richardson. TX. Analyze and provide wireless telecommunication system (GSM, UMTS & CDMA technology) specification requirements; provide models for predictive analysis of algorithms, capacity and performance of core network design; Research relevant wireless telecom and internet standards; recommend protocols in 2.5G, 3G, NGN domain to define system architecture allowing network-wide interoperability. BS in electrical/electronics / computer engineering and 1 year related experience. Send resume to HR., Spatial Wireless, Inc., 1651 North Glenville, # 216, Richardson, TX 75081.

Operations Coordinator: Establish schedules; run batches; monitor logs/reports; conduct troubleshooting errors; develop improvements on processes; coordinate daily operations; monitor and maintain daily tape backup cycles and off-site storage service; and provide user account/security administration; install and upgrade Novell Netware and Microsoft NT servers; provide installation, testing, configuration and implementation of ERP (Enterprise Resource Planning) products.

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Sr. Software Engineer: Wanted by optical networking system developer in Oceanport, NJ to design Wavelength Management System Server and infrastructure software. Bachelor's degree or equivalent in Computer Science or related field and a minimum of 2 years of experience in the Development of Network Management Systems for Optical Communications. respond to: Doreen Connors, HR Dept. (ref#_008), Tellium, Inc., 2 Crescent Place, Oceanport, NJ 07757.

SYSTEMS ANALYSTS: Systems On Line Inc., Houston based company requires Systems Analysts to research, analyze, design and develop operational procedures to automate processing and to develop new systems to improve production. Knowledge of SAP, Oracle, and other business related software is essential. Needs a Masters in Engineering/CS or in any related field combined with 1 years relevant experience in designing and developing computer software systems OR Bachelor's combined with 5 years relevant experience considered. Please send resumes to Mr. Srinivas Sonti, Recruiter, Systems On Line, Inc., 3737 Hillcroft, Suite # 275, Houston, TX 77057-7716.

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Software Developers. Assist in defining sys scope & requirements, analyze use of existing sys requirements, & design & develop sys in light of future directions in hardware & software growth. Develop & direct design of software sys. MS in comp. sci, engg, or related tech. field. Technical knowledge of: RPG/400, Java, C++, MicroFocus Cobol, or COM/VC++/Visual Basic demonstrated through edu. or exp.

Software Analysts. Design, develop, code, test & debug software applications. Req. BS in comp. sci, engg, or related tech. field. Tech knowledge of: RPG/400, Java, C++, MicroFocus Cobol, or COM/VC++/Visual Basic demonstrated through edu. or exp.

Senior Software Engineers. Develop & direct software programming, documentation & sys testing procedures for software program apps. Req. MS in comp sci. engg or related tech field & 3 yrs exp as an analyst, programmer, or developer, or a BS in a tech field & 5 yrs exp as an analyst, programmer, or developer. Tech knowledge of RPG/400, Java, C++, MicroFocus Cobol, or COM/VC++/Visual Basic demonstrated through edu. or exp.

Resumes to: J. Lurey, Manhattan Associates, 2300 Windy Ridge Pkwy, 7th Fl. North, Atlanta, Georgia 30339

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Software Eng (mult. openings): Designs develops and implements computer software systems applying principles and techniques of comp science, engineering and mathematical analysis. Analyzes s/w requirements to determine feasibility of design and directs s/w system testing procedures, programming and documentation using: graphic user interface, object oriented design and related languages, internet based technology, h/w, s/w and o/s. Work requires frequent travel and relocation. Must have two yrs as Sr. soft. eng. or comp. prof. req'd incl. two years of demonstrable, professional exp. with, 2 of A and 2 of B, and one year of experience with 2 of C: A)Oracle, PL/SOL, SOL, SOL Server, SOL forms, Reportwriter, B) Pro*C, Powerbuilder, Rational Rose, Windows NT/98/95/2000, Visual Basic, C++, MS Visual Slick, MS Visual Source, C) JAVA, JAVA Beans, Servlet, J-tools, Microsoft IIS, JAVA Script, HTML, ASP, WEBlogic.. Master's. degree or foreign equivalent in one of several ltd. fields: computer sci./appls, eng., math.. Will accept BS plus 5 years of progressive experience. Salary: $78,000/year, F/T. Please submit resumes to: Mgr., Armstrong Cty Team PA Careerlink, 1270 North Water St , PO Box 759, Kittanning, PA 16201. Reference Job Order No. WEB212956.

Seeking qualified applicants for the following positions in one or more of the following locations - Memphis, Orlando, Irving/Dallas, TX and Colorado Springs: Programmer, Programmer Analyst, Sr Programmer Analyst, Technical Advisor, Software Engineer, Technical Analyst, Sr Technical Analyst, Systems Programmer, Sr Systems Programmer, Business Applications Analyst, Sr Business Applications Analyst, Database Administrator and Sr Database Administrator. Candidates must have a bachelor's degree in computer science, MIS, engineering or related field. Experience varies based on position (from 0-7 years). Experience desired with one or more of the following: C; C++; UNIX; Java; SOL; logistics applications; object-oriented development; RDBMS; OLAP tools; client/server technology; CASE management; mainframe systems; DB2. Send resumes to FedEx Corporate Services, Attn. Christin Decker, 1900 Summit Tower Blvd., Suite 1400, Orlando, FL 32810. EOE M/F/D/V

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SOFTWARE ENGINEER to provide on-site software consultancy to design, develop, test, implement, support and maintain software systems using COBOL, C/C++, SOL, CA-W4GL, Cognos Powerhouse, Perl scripting and Unix script languages; integrate web applications and legacy systems in UNIX and IBM mainframe environment; design and develop relational databases using Turbo Image, Ingres, Allbase and Oracle on HP 3000 and HP 9000 machines in MPE iX, HP-UX and Windows NT operating Systems. Require: eight years of experience in the job offered or as Programmer/Analyst or any experience providing skills in described duties. 40% travel to client sites within the United States required. Competitive salary and benefits. Mail resume to: President, YASH Technologies, Inc., 2100 Parklake Drive, NE, Suite F, Atlanta, GA 30345-2167.

Programmer/Analyst. Must have Bachelor's Degree in Computer Information Systems or equivalent, and min. 2 yrs exp. in job offered, min. 6 months exp. in Microsoft Access. Must have proof of legal authority to work in the U.S. Develop and implement software systems and client server applications; systems maintenance; enhancement support for client server applications under Windows; system admin. activities. Evaluate user requests for new and modified programs to determine feasibility, costs, time requirements, and compatibility with existing systems and computer capabilities. 40 hrs/wk, 9AM-5PM. $63K/yr. Apply in person or by sending 2 resumes to: Gwinnett, Job Order #GA 7037769, 1535 Atkinson Rd., Lawrenceville, GA 30043-5601 or the nearest Dept. of Labor Field Service Office.

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Database Administrator-SOL (Job Code: SOL)

Candidates must have either a minimum of 2 years PeopleSoft system administration experience or experience in a database technical support environment including administrative support and on-call experience.

Interested candidates should send resumes and job code to Patrick DeVivo, Human Resources Generalist, Lahey Clinic, 41 Mall Rd., Burlington, MA 01805. No phone calls please.

Systems Analyst. $63K/yr. 8a-5p, 40 hrs/wk. Analyze, dsgn, dvlp, prgm, test & implmt s/ware systms & applics using ORACLE, Sybase, SOLBase, AS400, Centura (Gupta), RPG400, VisualBasic (VB), FoxPro & MF-COBOL. Masters or equiv in Comp Sci or Engg, Electronics, Electrical or related branch of Engg; Mathematics, Statistics, Commerce or Bus Admin. In lieu of Masters deg, Bach in reqd major + 4 yrs work exp using ORACLE, Sybase, SOLBase, AS400, Centura (Gupta), VisualBasic accepted. Must have proof of legal auth to work in US. Report or send 2 resumes to: Gwinnett J.O. #GA 7043767, 1535 Atkinson Rd., Lawrenceville, GA 30043-5601 or nearest DOL Field Srvc Ofc.

Computer Programmers. Minimum Bachelor Degree in Computer Science or equivalent. 2 yrs. exp. Devel., maint., and computer systems for fin. inst. as follows: TUXEDO, C, Unix, Shell, VFP, Web Logic, ASP, Socket API Programming, PowerBuilder 6.5, Visual Basic, Infomix, SOL and TCP/IP. 40 hrs. per week, 9 a.m. through 5 p.m. Monday through Friday. Attn: CPPLW, PO Box 5275, New York, NY 10185-5275.

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Systems Analyst. Responsible for Wholesale Distribution Systems analysis, design, and development; website design and programming; computer system support needs; and research and dissemination of information on technology issues. Must have Bachelor's degree in Computer Science, MIS or related, one year experience, and knowledge of PROGRESS and UNIX. Send resume with cover letter to Big Rock Sports, L.L.C., Attn: Norm Pollock, 173 Hankison Drive, Newport, North Carolina 28570.

R&D Engineer: For language modeling. Perform programming development in a speech recognition group. Min req's: 2 yrs exper w/speech recog., expertise in large vocab language modeling. C Programming. Respond to HR@eScription.com

Project Director-Plan, direct and coordinate activities of computer professionals in multi-tiered client/server, internet/intranet based multi-user applications projects. Min. 3 yrs. exp. in position offered or as a Lead Tech. Consultant and *MS degree in Comp. Sci. or related field. *In lieu of MS, will accept BS plus 2 additional yrs. of exp. in job offered or as a Tech. Consultant. Exp. references required. Salary $94K/yr. Send resume to: Teckpros, 85 Arlington Drive, Covington, GA 30016.

Comp S/ware Co in Skillman, NJ seeks Progrmmr/Systms Analysts/Softwre Engrs. All positions req Bach degree in Comp Sci/Comp Eng/Math or reltd field & 1-3 yrs exp. Send resume to Optimal Solutions Inc, 3 Richmond Dr., Skillman, NJ 08858.

Help Desk Level II sought by IT consulting firm. Must have Bachelor's degree in Computer Science or related field and at least 2 years of IT experience. Experience in troubleshooting technical and hardware problems required. Respond to: Joseph Triolo, Spherion Infrastructure Solutions Group, 9 Polito Avenue, Lyndhurst, NJ 07071.

"Wanted Programmer Analyst/ with SAP & Internet by IT Consulting Firm in Newington, CT. Must have at least two years experience in implementing net enabled modules, particularly SD/MM, utilizing SAP SD/MM Ver 4.0, HTML, Java Script, CRM, PERL, ARIS, MS Project and MS Access besides Master Degree in Business Administration. Respond to HR Manager, Infowave Systems, Inc., 705 North Mountain Rd., Suite # A 220, Newington, CT 06111."

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Computer Programmers. B.S. in Comp. Sci. or related. Novell CAN, Microsoft MCP. Min. 2 yrs. exp. developing, applying, and maintaining heavily used database and LAN for financial services firm and 2 yrs. experience with MS Windows NT 4.0 (LAN)/9x/2k, NOVELL, Netware 4.11 (LAN), MS Dos, C/C++, MFC, VB, VC++, Pascal, Assembly, Microsoft SOL Server 7.0, VFP, FoxPro, FoxBASE. 40 hrs. per week, 9 a.m. through 5 p.m. Monday through Friday. Send Resume: Attn: CPPGR, PO Box 5275, New York, NY 10185-5275.

SYSTEMS ANALYST: Analyze and design system. Duties as team lead. Utilize VB6, ASP, SOL Server 7.0. Req.: Bachelor's in Sci., Math, Eng., or related. (Employer will accept a foreign degree equiv.) 1 yr. exp. in the job off. or 1 yr. as programmer-analyst or comb of both. Resume to: Definition 6, Inc. 2115 Monroe Dr., Atlanta, GA 30324.

SAP Data Conversion Engineer: Design and Development of SAP computer software systems and data conversion. Required: BS in Computer Science and/or Math or Electrical Engineering or related, and certification in SAP R/3 Controlling Track. No Phone Calls. Resumes forwarded to: P.W. Kennedy, BackOffice Associates, Inc P. O. Box 1215 Orleans, MA 02653 or fax to 508-255-2707.

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Sr. Sys. Analyst wanted by NJ based co. Must have Bachelor's degree in Comp. Sc., Engg., Mgmnt. Info. Sys. or Bus. Admin. 6 yrs. of exp. in Comp. S/W developing and/or consulting. Will accept Master's degree & 3 yrs. of exp. in lieu of the Bachelor's degree & 6 yrs. of exp. Respond to: HR Dept., Bathena Holding Company, Inc., 1659 State Highway 88, Brick, NJ 08724. No phone calls. (Ref: GG7963IM).

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The nation's – and some would say the world's – financial center lies at the heart of New York City. From the New York Stock Exchange to the offices of major financial institutions, this service industry constantly pushes the envelope on information technology. In the days and weeks following Sept. 11, the IT community moved into high gear to reestablish networks and infrastructure – to get the nation's economy back on track. Untold hours of effort were donated and staffers at IT firms throughout the financial district created new levels of expertise and performance in the work they did to rebuild the systems.

However, even before Sept. 11, "demand for our services had shifted from new application development to improved quality control," explains Jim Seery, area vice president for consulting firm **Spherion**. "Debugging and rewriting applications is costly, making testing and quality assurance more important than ever to our clients as part of cost containment."

Spherion's key practices include Enterprise Application Integration, Software Quality Management, and Information Design Services. These three aspects provide a balance for the firm as economic needs shift. "It also provides variety in projects and options for careers," says Seery. "An important part of this practice includes e-learning, which involves delivering knowledge to the desk of every employee as well as providing online coursework." **Spherion** is hiring quality assurance analysts, process improvement specialists, software developers, project managers and those certified in the Mercury Tool Suite. "We look at the market demands and the skill sets we have and create new learning opportunities for employees."

Both **Spherion** and the **Security Industry Automation Corporation**, known as **SIAC** throughout the financial world, have been providing support to the financial services industry for more than three decades. **SIAC** was one of the firms that played a role in bringing Wall Street back online following the events of Sept. 11. **SIAC** has been responsible for the NYSE's flawless transition to Y2K and conversion to the decimal system. The **SIAC** team also developed a virtual, or three-dimension, trading floor known as 3DTF. "The results of our efforts show up every night on the six o'clock news," says Lynn Hart, **SIAC's** managing director of human resources.

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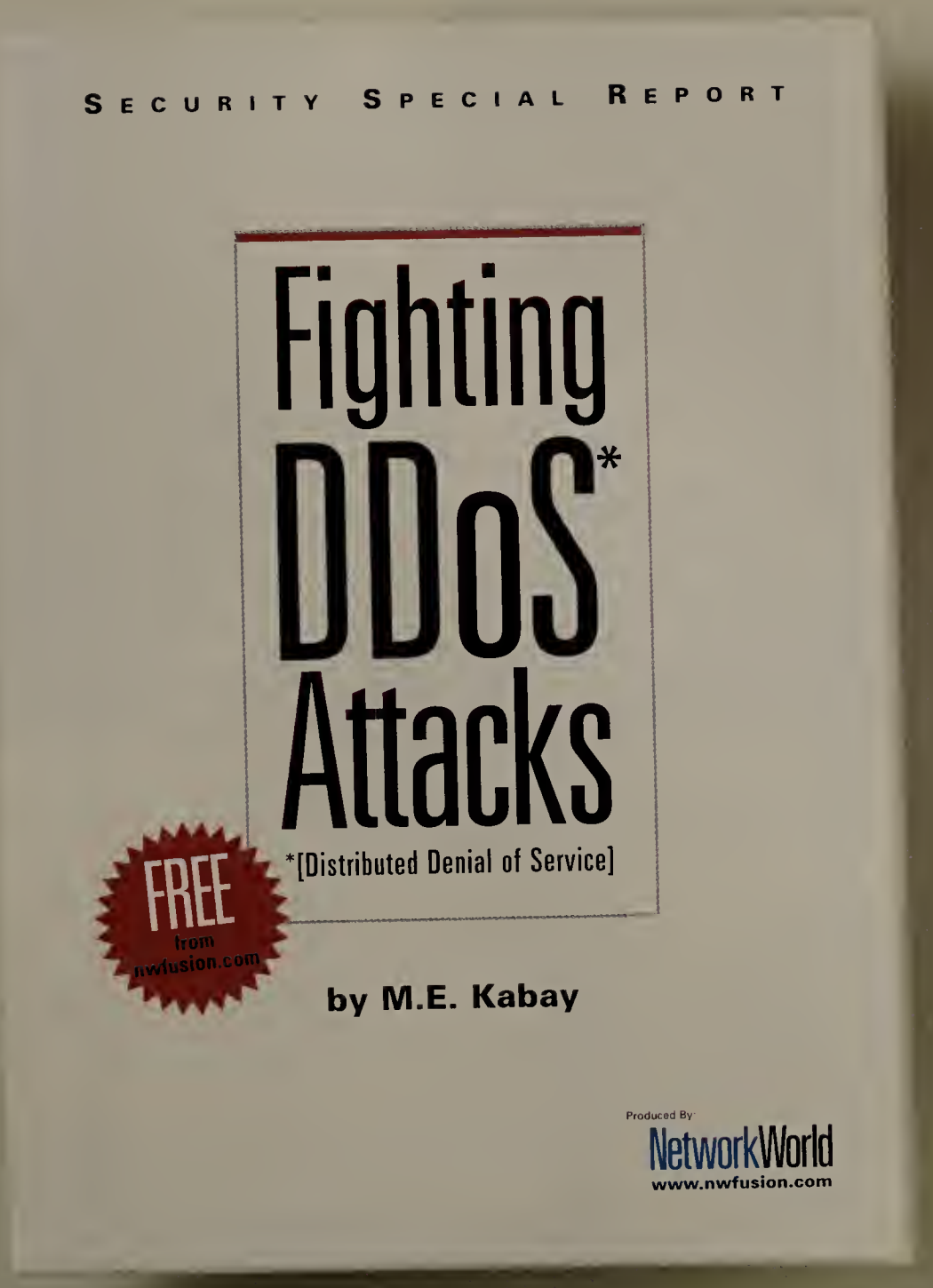

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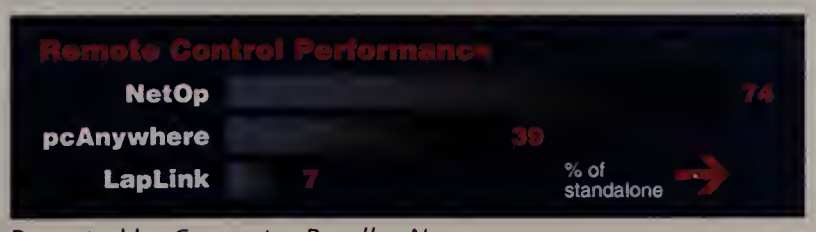

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